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# BULLETIN OF DUKE UNIVERSITY

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## *Financial Report*




## 1962-1963

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BULLETINS

OF

# DUKE UNIVERSITY

## FINANCIAL REPORT

Year Ended June 30, 1963

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## LETTER OF TRANSMITTAL

To the Board of Trustees of Duke University:

We submit herewith for your examination and information the annual financial report of Duke University, showing in some detail the results of the operation for the year ending June 30, 1963.

The figures contained in this report have been verified by our certified public accountants, and the certificate of Peat, Marwick, Mitchell & Co. is included as a part of this report.

It will appear from the Statement of Income, Expenditures, and Appropriations that the University, other than the Hospital, closed the year with a net income from operations of $481,612, but that Duke Hospital operated at a net loss of $224,804 making the net operating income for the University as a whole $256,804. This amount has been allocated to the operating budget for 1963-64.

The following summary and comparison of Educational and General receipts and expenditures will be of interest.

| | 1963 | | 1962 | |
|---|---|---|---|---|
| *Income* | *Amount* | *Per Cent of Total* | *Amount* | *Per Cent of Total* |
| Endowment income | $ 6,692,868 | 28% | $ 6,123,053 | 29% |
| Gifts and grants: | | | | |
| Loyalty funds | 409,856 | 2 | 340,017 | 2 |
| For research | 7,688,885 | 32 | 8,050,386 | 38 |
| For training programs | 1,754,154 | 7 | 1,611,862 | 8 |
| For the libraries | 27,961 | — | 12,659 | — |
| For professorships | 138,500 | — | 25,000 | — |
| For current expenses: | | | | |
| Faculty salary improvement | 750,486 | 3 | 413,330 | 2 |
| Other | 491,613 | 2 | 431,758 | 2 |
| Total gifts and grants | 11,261,455 | 46 | 10,885,012 | 52 |
| Tuition and fees | 5,275,027 | 22 | 5,038,497 | 24 |
| Sundry: | | | | |
| Other investment income | 211,690 | 1 | 141,028 | — |
| Other income | 1,504,071 | 6 | 1,422,077 | 7 |
| Total sundry | 1,715,761 | 7 | 1,563,105 | 7 |
| Amounts transferred from (to) restricted fund balances representing excess of current expenditures over current income (excess of income over expenditures) | 812,473 | 3 | (724,817) | (3) |
| Appropriations (net) to other income classifications | (1,482,524) | (6) | (1,937,497) | (9) |
| Total income | $24,275,060 | 100% | $20,947,353 | 100% |
| *Expenditures* | | | | |
| Administration | $ 1,310,442 | 6% | $ 1,237,555 | 6% |
| General operations | 654,930 | 3 | 473,588 | 2 |
| Instruction, other than Professorships (including summer sessions) | 8,321,400 | 35 | 7,725,939 | 37 |

| | | | | |
|---|---|---|---|---|
| Research | 8,003,297 | 33 | 6,600,071 | 31 |
| Training programs | 1,743,793 | 7 | 1,554,399 | 7 |
| Libraries | 1,188,965 | 5 | 1,070,448 | 5 |
| Professorships | 110,094 | — | 25,298 | — |
| Staff benefits | 1,077,566 | 5 | 978,937 | 5 |
| Physical plant | 1,544,125 | 6 | 1,359,744 | 6 |
| Other | 27,944 | — | 106,822 | 1 |
| Total expenditures | $23,982,556 | 100% | $21,132,801 | 100% |

The Endowment Income shown above includes income from the Duke Endowment in the amount of $3,961,494 for 1963 and $3,576,338 for 1962.

The Endowment Funds of the University are invested in securities in accordance with an investment policy established by the Investment Committee of the Board of Trustees. A list of securities held at June 30, 1963 begins on Page 82 of this report. A summary of the types of securities held at June 30, 1963, including both cost and market values, follows:

| *Description* | *Cost or Amortized Value* | *Quoted Market Value* |
|---|---|---|
| *Endowed Funds:* | | |
| Endowment Funds | $39,818,346 | $65,774,346 |
| Endowed Special Funds | 2,644,342 | 3,609,845 |
| Scholarship Funds | 4,402,214 | 7,120,661 |
| Student Loan Funds | 121,202 | 214,151 |
| Total Endowed Funds | 46,986,104 | 76,719,003 |
| Funds Functioning as Endowment | 2,444,715 | 2,471,776 |
| *Other Funds:* | | |
| Current Restricted | 2,479,308 | 3,219,126 |
| Agency | 218,365 | 248,542 |
| Total Other Funds | 2,697,673 | 3,467,668 |
| Pooled cash and securities (Current Fund) | 13,031,722 | 13,065,021 |
| Total | $65,160,214 | $95,723,468 |

The Balance Sheet and the summaries above include only those assets to which title actually vests in Duke University and consequently do not include any portion of the indivisible Corpus of The Duke Endowment, the income from which, subject to the terms of the Trust Indenture, accrues to Duke University as one of the several beneficiaries. Nor do the accounts include the principal funds of trusts independently administered for the benefit of Duke University; such as, the Angier B. Duke Memorial, Inc., Frederic M. Hanes Bequest, the Frederic M. Hanes Memorial Trust, the Albert Anderson Bequest, the James A. Gray Foundation, and the Mary Alyse Smith Scholarship Fund.

Respectfully submitted,

G. C. HENRICKSEN
*Vice President for Business and Finance*

S. C. HARWARD
*Comptroller*

September 30, 1963

## REPORT OF INDEPENDENT CERTIFIED PUBLIC ACCOUNTANTS

The Board of Trustees
Duke University
Durham, North Carolina:

We have examined the balance sheet of Duke University as of June 30, 1963 and the related condensed statement of income, expenditures and appropriations for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and condensed statement of income, expenditures and appropriations present fairly the financial position of Duke University at June 30, 1963 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

PEAT, MARWICK, MITCHELL & CO.

Greensboro, N. C.
August 16, 1963

# BALANCE SHEET

## June 30, 1963

## ASSETS

| | | |
|---|---|---|
| CURRENT FUND: | | |
| Pooled cash and securities: | | |
| Cash | $ 403,313 | |
| Securities, at cost or amortized value: | | |
| U.S. Government securities | 10,645,617 | |
| Short-term notes | 2,356,000 | |
| Interest purchased | 30,105 | |
| | 13,031,722 | |
| | 13,435,035 | |
| Less equity of other funds | 11,689,232 | |
| | 1,745,803 | |
| Accounts receivable, after deducting $2,045,648, which is a 100% reserve against hospital patients' accounts | 462,457 | |
| Inventories, at cost | 1,065,456 | |
| Deferred charges | 48,220 | |
| | | $ 3,321,936 |
| CURRENT RESTRICTED FUNDS: | | |
| Equity in pooled cash and securities | 5,551,526 | |
| Notes receivable | 11,770 | |
| Accounts receivable | 2,025 | |
| Investments, at cost or amortized value | 2,479,308 | 8,044,629 |
| FUND FUNCTIONING AS ENDOWMENT: | | |
| Equity in pooled cash and securities | 2,150,000 | |
| Investments, at cost or amortized value | 2,444,715 | 4,594,715 |
| ENDOWMENT FUNDS: | | |
| Equity in pooled cash and securities | 106,258 | |
| Investments, at cost or amortized value | 39,818,346 | 39,924,604 |
| Carried forward | | $55,885,884 |

# BALANCE SHEET

## June 30, 1963

## LIABILITIES AND FUND BALANCES

| | | |
|---|---|---|
| CURRENT FUND: | | |
| Accounts payable and encumbrances: | | |
| Accounts payable | $ 611,124 | |
| Purchase orders and other encumbrances | 1,014,784 | |
| | 1,625,908 | |
| Students' deposits | 237,661 | |
| Deferred income: | | |
| Loyalty funds (1962-63, expendable for general purposes in 1963-64): | | |
| Duke University | 342,936 | |
| Medical School | 50,356 | |
| | 393,292 | |
| Endowment-The James B. Duke Professorship Fund | 98,540 | |
| Other | 223,512 | |
| | 715,344 | |
| Reserves: | | |
| Development of Graduate School | 152,488 | |
| Faculty salary improvement | 248,720 | |
| Post retirement benefits | 63,000 | |
| Other | 3,409 | |
| | 467,617 | |
| Surplus (note 4): | | |
| Reserve for Undistributed Income | 628,823 | |
| Less unabsorbed deficit from Hospital operations (to June 30, 1960) | 353,417 | |
| | 275,406 | $ 3,321,936 |
| CURRENT RESTRICTED FUNDS: | | |
| Purchase orders and other encumbrances | 1,565,381 | |
| Balance of funds | 6,479,248 | 8,044,629 |
| FUND FUNCTIONING AS ENDOWMENT: | | |
| Balance of fund | | 4,594,715 |
| ENDOWMENT FUNDS (note 1): | | |
| Principal of funds with income designated for general purposes, including net realized gains on investments, $8,181,904 | | 39,924,604 |
| Carried forward | | $55,885,884 |

## BALANCE SHEET—Continued

### Assets—Continued

| | | |
|---|---|---|
| Brought forward | | $ 55,885,884 |
| ENDOWED SPECIAL FUNDS: | | |
| Equity in pooled cash and securities | $ 196,200 | |
| Investments, at cost or amortized value | 2,644,342 | 2,840,542 |
| SCHOLARSHIP FUNDS: | | |
| Equity in pooled cash and securities | 402,865 | |
| Investments, at cost or amortized value | 4,402,214 | 4,805,079 |
| STUDENT LOAN FUNDS: | | |
| Equity in pooled cash and securities | 154,582 | |
| Notes receivable | 491,552 | |
| Investments, at cost or amortized value | 121,202 | 767,336 |
| PLANT FUNDS (note 3): | | |
| Equity in pooled cash and securities | 2,582,673 | |
| Land, buildings, equipment, library books, including construction in progress | 85,703,417 | 88,286,090 |
| AGENCY FUNDS: | | |
| Equity in pooled cash and securities | 545,128 | |
| Notes and accounts receivable including student loan notes, $1,066,654 | 1,233,602 | |
| Inventories, at lower of cost or market | 52,114 | |
| Investments, at cost | 218,365 | |
| Deferred charges | 2,968 | 2,051,277 |
| | | $154,636,208 |

See accompanying notes to financial statements.

## BALANCE SHEET—Continued

### Liabilities and Fund Balances—Continued

| | | |
|---|---|---|
| Brought forward | | $ 55,885,884 |
| ENDOWED SPECIAL FUNDS: | | |
| Principal of funds with income designated for restricted purposes, including net realized gains on investments, $661,803 | $ 2,620,496 | |
| Surplus expendable | 220,046 | 2,840,542 |
| SCHOLARSHIP FUNDS: | | |
| Principal of funds with income designated for scholarship aid, including net realized gains on investments, $1,031,029 | 4,371,627 | |
| Surplus expendable | 433,452 | 4,805,079 |
| STUDENT LOAN FUNDS: | | |
| Principal of funds with income designated for student loans, including net realized gains on investments, $22,110 | 52,283 | |
| Principal of funds available for loans, including net realized gains on investments, $31,743 | 164,194 | |
| | 216,477 | |
| Surplus available for loans | 550,859 | 767,336 |
| PLANT FUNDS: | | |
| 3-1/2% Serial Bonds (note 6) | 2,400,000 | |
| Commitments for construction in progress | 234,444 | |
| Investment in plant | 83,068,973 | |
| Balance of funds—net (notes 4, 6 and 7) | 2,582,673 | 88,286,090 |
| AGENCY FUNDS: | | |
| Sundry liabilities | 87,262 | |
| Balance of funds | 1,964,015 | 2,051,277 |
| | | $154,636,208 |

# CONDENSED STATEMENT OF INCOME, EXPENDITURES AND APPROPRIATIONS

## Fiscal Year Ended June 30, 1963

### Income

| | | |
|---|---|---|
| EDUCATIONAL AND GENERAL: | | |
| Endowment income | $ 6,692,868 | |
| Loyalty funds: | | |
| Duke University | 355,952 | |
| Medical School | 53,904 | |
| Gifts and grants for research | 7,688,885 | |
| Grants for training programs | 1,754,154 | |
| Gifts for the libraries | 27,961 | |
| Gifts for professorships | 138,500 | |
| Gifts for current expenses: | | |
| Faculty salary improvement | 750,486 | |
| Other | 491,613 | |
| Tuition and fees | 5,275,027 | |
| Other investment income | 211,690 | |
| Other income | 1,504,071 | |
| Transfer from principal of Endowed Special Funds | 25,000 | |
| | 24,970,111 | |
| Amounts transferred from restricted fund balances representing excess of current expenditures over current income | 787,473 | |
| | 25,757,584 | |
| Less appropriations (net) to other income classifications | 1,482,524 | $24,275,060 |
| RELATED ACTIVITIES—hospital revenue | | 6,763,283 |
| Net income from auxiliary enterprises (note 2) | | 316,079 |
| Total current income | | 31,354,422 |
| NON-EDUCATIONAL: | | |
| Gifts for fellowships and scholarships | 613,028 | |
| Gifts for miscellaneous purposes | 464,872 | |
| Investment income | 325,082 | |
| Other income | 613,647 | |
| | 2,016,629 | |
| Deduct amounts transferred to restricted fund balances representing excess of current income over current expenditures | 232,673 | |
| | 1,783,956 | |
| Add appropriations (net) from other income classifications | 301,551 | 2,085,507 |
| Carried forward | | $33,439,929 |

# CONDENSED STATEMENT OF INCOME, EXPENDITURES AND APPROPRIATIONS

## Fiscal Year Ended June 30, 1963
## Expenditures

| | | |
|---|---|---|
| EDUCATIONAL AND GENERAL: | | |
| Administration | $ 1,310,442 | |
| General operations | 654,930 | |
| Instruction, other than Professorships | 8,152,585 | |
| Research and training programs (note 2) | 9,747,090 | |
| Libraries | 1,188,965 | |
| Professorships | 110,094 | |
| Summer sessions | 168,815 | |
| Staff benefits (note 2) | 1,077,566 | |
| Transfers to principal of Endowed Special Funds | 27,944 | |
| | 22,438,431 | |
| Physical plant | 1,544,125 | $23,982,556 |
| RELATED ACTIVITIES: | | |
| Hospital expenditures (note 2) | 6,988,091 | |
| Other expenditures—net | 126,971 | 7,115,062 |
| Total current expenditures | | 31,097,618 |
| NON-EDUCATIONAL: | | |
| Fellowships and scholarships | 1,282,233 | |
| Miscellaneous | 799,406 | |
| Transfers to principal of funds: | | |
| Endowed Special Funds | 634 | |
| Scholarship Funds | 3,234 | 2,085,507 |
| Carried forward | | $33,183,125 |

## CONDENSED STATEMENT OF INCOME, EXPENDITURES AND APPROPRIATIONS—Continued

### Income, Continued

| | | |
|---|---|---|
| Brought forward | | $33,439,929 |
| PLANT FUNDS: | | |
| Gifts | $ 3,170,915 | |
| Investment income | 18,981 | |
| Received from Fund Functioning as Endowment —net | 758,697 | |
| Proceeds from sale of 3-1/2% Serial Bonds (note 6) | 2,400,000 | |
| Received from auxiliary enterprises | 302,985 | |
| Other income | 242,976 | |
| | 6,894,554 | |
| Deduct amounts transferred to restricted fund balances representing excess of current income over current expenditures | 408,084 | |
| | 6,486,470 | |
| Add appropriations from other income classifications of which $361,999 is from Current Fund | 1,180,973 | 7,667,443 |
| | | $41,107,372 |

See accompanying notes to financial statements.

## CONDENSED STATEMENT OF INCOME, EXPENDITURES AND APPROPRIATIONS—Continued

### Expenditures, Continued

| | | |
|---|---|---|
| Brought forward | | $33,183,125 |
| PLANT FUNDS: | | |
| Capital expenditures | $ 6,830,392 | |
| Maintenance and other expenditures | 834,559 | |
| Transfer to principal of Endowed Special Funds | 2,492 | 7,667,443 |
| | | 40,850,568 |
| Current Fund net income after deducting $224,808 deficit from Hospital operations | | 256,804 |
| | | $41,107,372 |

## NOTES TO FINANCIAL STATEMENTS

### June 30, 1963

(1) The accounts do not include as endowment that portion of the indivisible Corpus of The Duke Endowment, the income of which accrues to Duke University subject to the terms of a Trust Indenture dated December 11, 1924, whereby Mr. James B. Duke established a trust to be administered for educational and charitable purposes.

(2) Staff benefits included in expenditures during the year were as follows:

| | |
|---|---|
| Administration, faculty and staff | $1,077,566 |
| Research and training programs | 332,415 |
| Related activities | 252,762 |
| Auxiliary enterprises | 98,551 |
| | $1,761,294 |

(3) Land, buildings, equipment, and library books are stated in the accompanying balance sheet at amounts shown on the books, which are substantially at cost of original assets acquired. In accordance with generally accepted institutional accounting practices, depreciation on buildings and equipment is not reflected in the accompanying financial statements other than provision for replacement of certain dormitory and other auxiliary service facilities. Further, assets discarded are removed from plant accounts when it is practicable to determine original cost.

(4) Balance of Plant Funds—net, at June 30, 1963, is after deducting deficits of $152,142 which have arisen from expenditures in excess of funds received for several facility projects. These deficits will be recovered in future years from outside gifts, Current Fund appropriations, and transfers from expendable funds.

(5) Investments in the several funds listed in the balance sheet aggregate $65,160,214 at June 30, 1963 which compares with an aggregate quoted market value of $95,723,468 at that date. Of the excess, $30,563,254 of market over cost or amortized value, $25,956,000 is applicable to investments of the Endowment Funds.

(6) In January, 1963, the University completed an apartment facility for married students attending Graduate and Professional Schools. In connection therewith, the University entered into a loan agreement, dated July 1, 1961, with the United States Government (Community Facilities Administration) and issued $2,400,000 of 3½% Serial Bonds designated as "Duke University Apartment Housing Bonds of 1961," payable in annual installments commencing September 1, 1964 ($30,000) with increasing annual amounts to the year 2001. The bonds are secured by a first mortgage on the facility (carried at a cost of approximately $2,600,000) and a first lien on and pledge of the net revenues to be derived from its operation. Under the terms of the agreement, the University has deposited, with the Trustee, $235,000 principal amount of U. S. Treasury Bonds to secure the payment of interest and principal.

(7) Open contracts for construction of buildings and equipment amounted to approximately $3,489,000 at June 30, 1963.

# SCHEDULE A—ENDOWMENT FUNDS

| | Book Value |
|---|---|
| **WILLIAM B. BELL ENDOWMENT FUND**<br>Established 1951 by bequest from William B. Bell; to be added to the general endowment of the University. | $ 40,733.56 |
| **CENTENNIAL ENDOWMENT FUND**<br>Gifts from a number of individuals in connection with the Centennial celebration of Duke University; the income to be used annually, in the judgment of the Trustees, for the benefit of the University. | 69,450.09 |
| **JOSEPH COHAN ENDOWMENT FUND**<br>Established 1959 by bequest from Joseph Cohan; to be added to the general endowment of the University. | 38,368.77 |
| **ANGIER BUCHANAN DUKE ENDOWMENT FUND**<br>Established 1923 by bequest of Angier Buchanan Duke, '05; to be added to the general endowment of the University. | 476,547.77 |
| **B. N. DUKE ENDOWMENT FUND**<br>Established 1913 by gift from Benjamin Newton Duke; to be added to the general endowment of the University. | 861,488.70 |
| **DORIS DUKE ENDOWMENT FUND**<br>Established 1955 by gift from Doris Duke and allocated by the Trustees for permanent endowment. | 390,043.78 |
| **J. B. DUKE ENDOWMENT FUND**<br>Established 1913 by gift from James Buchanan Duke; to be added to the general endowment of the University. | 2,844,736.86 |
| **THE JAMES B. DUKE PROFESSORSHIP FUND**<br>Established 1952 by gift from The Duke Endowment; the income to be used for the purpose of attracting and/or developing distinguished or outstanding professors at the University. | 2,257,868.59 |
| **SARAH P. DUKE BEQUEST TO THE B. N. DUKE ENDOWMENT FUND**<br>Established 1939 by bequest from Mrs. Sarah Pearson Duke; one-half of the net income to be used for the general purposes of the University; and one-half of the net income to be used for the establishment of the B. N. Duke Scholarships. | 902,080.96 |
| **WASHINGTON DUKE ENDOWMENT FUND**<br>Established 1897 by gift from Washington Duke; to be added to the general endowment of the University. | 323,240.07 |
| **DUKE UNIVERSITY ENDOWMENT FUND**<br>Established 1956 from gifts and grants which had been temporarily carried as funds functioning as endowment. | 18,264,227.80 |
| **C. C. DULA ENDOWMENT FUND**<br>Established 1927 by gift from Caleb C. Dula; to be added to the general endowment of the University. | 383,486.41 |

## Schedule A (Continued)—Endowment Funds

| | Book Value |
|---|---|
| **Robert L. Flowers Endowment Fund**<br>Established 1952 by bequest from Robert L. Flowers, '04; to be added to the general endowment of the University. | $ 259,277.34 |
| **Ford Foundation Endowment Fund**<br>Established 1956 by gift from The Ford Foundation; to be used to advance the academic program either by increases in faculty salaries or by meeting other pressing academic needs. | 3,173,177.63 |
| **Ford Medical School Endowment Fund**<br>Established 1956 by gift from The Ford Foundation; the income to be used for current instructional uses of the medical school. | 2,908,437.04 |
| **General Education Board Endowment Fund**<br>Established 1923 by gift from the General Education Board; to be added to the general endowment of the University. | 561,377.62 |
| **General Endowment Fund**<br>Established to accumulate sundry endowment gifts; from various individuals, foundations and corporations. | 857,555.74 |
| **Graduate School Endowment Fund**<br>Established to consolidate the Development of Graduate School Endowments; consisting of gifts by General Education Board, The Duke Endowment, and other Miscellaneous donors in 1950, 1951, and 1952 in connection with the Development Campaign. | 3,376,332.55 |
| **Elizabeth P. Hanes Endowment Fund**<br>Established 1952, being the unexpended portion of gift from Elizabeth P. Hanes, '08, for construction of a Nurses' Home; this residue being added to the general endowment. | 470,657.25 |
| **Walker P. Inman Endowment Fund**<br>Established 1951 by gifts from Walker P. Inman; to be added to the general endowment of the University. | 139,350.45 |
| **Florence Reynaud McAlister Chair of Medicine and Medical Research**<br>Established 1936 by gift from Mrs. Amelie McAlister Upshur; as a memorial to her sister. | 381,251.14 |
| **David Ovens Endowment Fund**<br>Established 1950 by gift from David Ovens; to be added to the general endowment of the University. | 104,603.46 |
| **W. R. Perkins Endowment Fund**<br>Established 1945 by bequest from William R. Perkins; to be added to the general endowment of the University. | 283,034.33 |

## Schedule A (Continued)—Endowment Funds

| | Book Value |
|---|---|
| **WILLIAM NEAL REYNOLDS ENDOWMENT FUND** | |
| Established 1950 by gift from William N. Reynolds, '86; to be added to the general endowment of the University. | $ 323,243.11 |
| **LUTHER P. TAPP MEMORIAL ENDOWMENT FUND** | |
| Established 1951 by gift from Mr. and Mrs. L. B. Jenkins, '10, and supplemented subsequently by additional gifts in memory of her father, Luther P. Tapp; the income to be used to supplement salaries of professors in the general field of the Humanities. | 82,761.80 |
| **WORD H. WOOD ENDOWMENT FUND** | |
| Established 1963 by bequest from Word H. Wood; to be added to the general endowment of the University. | 151,271.31 |
| TOTAL | $39,924,604.13 |

## SCHEDULE B—ENDOWED SPECIAL FUNDS

| | Book Value |
|---|---|
| **Alumni Activities Fund**<br>Established 1939 by gift of P. Frank Hanes, '11, in connection with the Centennial celebration of Duke University; the income to be used for the support of the activities of the Alumni Office. | $ 7,138.82 |
| **Avera Bible Fund**<br>Established 1895 by gift of Mrs. L. B. McCullers in memory of her husband, Willis H. Avera; the income to be used for the purchase of books for the Divinity School Library and for the support of the Avera Bible Lectures. | 5,581.37 |
| **Isaac Erwin Avery Fund**<br>Established 1905 from the proceeds of the sale of the publication of "Idle Comments," a collection of the writings of Isaac Erwin Avery, '94; the income to be used for the purchase of books in the field of journalism. | 2,076.20 |
| **Louis W. Bailey Memorial Fund**<br>Established 1958 by gift of A. Purnell Bailey, B.D., '48, in memory of his father, Louis William Bailey; the income to be used for purchasing books for the Divinity School Library. | 283.02 |
| **John Spencer Bassett Memorial Fund**<br>Established by miscellaneous gifts in memory of John Spencer Bassett, '88, formerly Professor in Trinity College; the income to be used for the purchase of books for the Library. | 849.64 |
| **Robert Spencer Bell Student Aid Fund**<br>Established 1942 by James A. Bell, '86, of Charlotte, N. C., in memory of his son, Robert Spencer Bell, and supplemented subsequently by additional gifts; the income to be used in providing annually a prize for one or more students evidencing the greatest improvement in his college work during the year. | 44,138.56 |
| **Bequest Program Fund**<br>Established 1963 to accumulate unrestricted gifts from bequests. | 1,261.68 |
| **Germain Bernard Fund**<br>Established 1959 by gift from B. C. Remedy Company and transferred in 1961 from Current Restricted Fund; the income to be used by the Duke University Medical School for scholarships, loans or research and if not used for these purposes, to be paid to the Duke University Medical Support fund as a part of the Loyalty Fund. | 3,488.07 |
| **Mary Duke Biddle Library Fund**<br>Established 1951 by gift from Mary Duke Biddle, '07, and supplemented subsequently by additional gifts; the income to be used to maintain and operate the library of Duke University. | 519,535.12 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **EDGAR S. BOWLING MEMORIAL FUND** | |
| Established 1955, by gift from Mrs. Edgar S. Bowling; the income to be transferred annually to the Duke University Loyalty Fund. | $ 3,399.71 |
| **JOSEPH G. BROWN BOOK FUND** | |
| Established 1921 by gifts of various individuals in honor of Joseph G. Brown, '75, chairman of the Board of Trustees 1917-27; the income to be used for the purchase of books for the Library. | 9,093.80 |
| **CHRISTIAN EDUCATION FUND** | |
| Miscellaneous contributions over a period of many years; to be used for various purposes designated by the donors. | 9,127.60 |
| **CLARK CLASSICAL PRIZE FUND** | |
| Established 1956 by bequest from David Taggart Clark; the income to be used for the award of an annual prize for Greek or Latin declaration or recitation. | 294.03 |
| **CLASS OF 1909 FUND** | |
| Established by members of the Class of 1909; the income to be used for the purchase of books for the General Library. | 1,898.18 |
| **MARY ALICE COOK MEMORIAL FUND** | |
| Established 1956 by gift from Franklin H. Cook, '36, in memory of Mary Alice Rhodes Cook, '36; the income to be transferred annually to the Duke University Loyalty Fund. | 707.28 |
| **C. T. COUNCIL FUND** | |
| Established 1959 by a gift from the B. C. Remedy Company and transferred from Current Restricted Fund in 1961; the income to be used by the Duke University Medical School for scholarships, loans or research, and if not used for these purposes, to be paid to the Duke University Medical Support Fund as a part of the Loyalty Fund. | 3,169.89 |
| **THE HARVEY B. CRAVEN FUND** | |
| Established May 9, 1960 by gift of Harvey B. Craven, '96; the income to be transferred annually to the Duke University Loyalty Fund. | 4,475.96 |
| **CROWELL SCIENCE LECTURE FUND** | |
| Established 1921 by contributions from various individuals; the income to be used for annual lectures on scientific subjects. | 3,696.75 |
| **JULIA DALE MEMORIAL FUND** | |
| Contributions by friends and relatives in memory of Miss Julia Dale; the income to be used to provide annually for the Julia Dale Prize in Mathematics. | 2,306.07 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **Discretionary Fund of the Dean of the Chapel**<br>Established 1956 by gift from Brewster, '32, and Edith Snow, '32; for special activities and services in connection with the work of the Dean of the Chapel. | $ 48,785.45 |
| **Duke Memorial Chapel Maintenance Fund**<br>Established 1930 by James A. Thomas; the proceeds to be used toward the maintenance of the Duke Memorial Chapel. | 4,546.85 |
| **Duke Monument Fund**<br>Established to provide for the perpetual maintenance of the statue of Washington Duke. | 3,499.84 |
| **Duke Pi Tau Sigma Award Fund**<br>Established 1956 by gift from The Duke Pi Iota Chapter of Pi Tau Sigma; the income to be used for an annual award to the mechanical engineering senior student who has presented the most outstanding paper in class work or in professional society competition. | 5,245.66 |
| **Eason Presbyterian Student Fund**<br>Established 1953 by gift from W. W. Eason; the income to be available for a Presbyterian ministerial student. | 228.54 |
| **Anne Flexner Memorial Fund**<br>Established October, 1947 by Dr. Morris Flexner and Mrs. Marion W. Flexner, in memory of their daughter, Anne Flexner, '45; the income to be used for an annual award to the student who does the most outstanding piece of creative writing. | 3,517.53 |
| **George Washington Flowers Memorial Fund**<br>Established 1941 by bequest of William W. Flowers, '94, in memory of his father, George Washington Flowers, and supplemented in 1952 by bequest of Robert L. Flowers, '04; the income to be used for the purchase of manuscripts, books and other printed or photographed materials dealing with the life and thought of the Southern states of the United States of America. | 421,134.39 |
| **John McTyeire Flowers Lecture Fund**<br>Established 1915 by gift of B. N. Duke in memory of John McTyeire Flowers, '00; the income to be used for lectures dealing with the subject of Christian citizenship. | 22,338.49 |
| **The Forestry Alumni Association Fund**<br>Established 1962 by gift from Duke University Forestry Alumni Association; the income to be used to purchase books for the F. X. Schumacher Statistical Library or for other purposes of the School of Forestry, as directed by the Forestry Alumni Association. | 520.15 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **WILLIAM F. FRANCK MEMORIAL FUND**<br>Established 1958 by gift from William F. Franck, Jr., '39, supplemented by additional gifts; the income to be used for cardiac research, or medical school scholarships, and if not used for these purposes, to be paid to the Loyalty Fund. | $ 7,634.88 |
| **JESSE T. AND LOVIE BROOKS FRIZZELLE MEMORIAL FUND**<br>Established 1954 by gift from Mark T. Frizzelle, '03, and supplemented by additional gifts from J. Paul Frizzelle, Sr., '04, Jasper B. Frizzelle, '09, and John L. Frizzelle, Sr., '12; the income to be transferred annually to the Duke University Loyalty Fund. | 20,346.61 |
| **GIBBONS MENTAL HEALTH FUND**<br>Established 1963 by bequest from John P. Gibbons; to be used to establish a J. P. Gibbons Professorship of Psychiatry. | 184,835.45 |
| **WILLIAM FRANCIS GILL MEMORIAL FUND**<br>Established 1918 by gifts of several individuals, in memory of William Francis Gill, '94, for many years Professor of Latin at Trinity College; the income to be used for a collection of books in the General Library in the field of Latin. | 1,500.47 |
| **F. M. HANES BEQUEST TO DEPARTMENT OF MEDICINE**<br>Established 1951 by bequest from F. M. Hanes; comprised of 20% of the proceeds from the Trust; the income to be used for the promotion of the highest standards of medical teaching and for medical research. | 134,805.57 |
| **F. M. HANES BEQUEST TO SCHOOL OF MEDICINE**<br>Established 1951 by bequest from F. M. Hanes; comprised of 20% of the proceeds from the Trust; the income to be used for the promotion of the highest standards of medical training and for medical research. | 134,805.57 |
| **FREDERICK M. HANES MEMORIAL TRUST FUND**<br>Established 1959 by bequest from Mrs. Elizabeth P. Hanes; comprised of 20% of the proceeds from the Trust; the income to be used for the promotion of medical teaching and medical research. | 4,135.78 |
| **P. HUBER HANES FUND**<br>Established 1939 by gift of P. Huber Hanes, '00; the income to be used as follows: three-fifths for the support of the P. Huber Hanes Scholarships; one-fifth to the P. Huber Hanes, Jr. Scholarship; and one-fifth to the Duke University Press. | 107,566.96 |
| **CHARLES W. HARGITT RESEARCH FELLOWSHIP IN ZOOLOGY FUND**<br>Established 1939 by Dr. George T. Hargitt; the proceeds to be used for establishing a research fellowship in Zoology, to be named in memory of Charles W. Hargitt. | 137,900.45 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **Winfred Quinton Holton Memorial Fund**<br>Established 1922 by gifts of Holland Holton, '07, and Mrs. Lela Young Holton, '07, in memory of their son, Winfred Quinton Holton; the income to be used to provide a prize for investigative work in primary education. | $ 3,649.07 |
| **Hospital Chaplains' Fund for Compassion**<br>Established 1963 by various contributors, in memory of Dorothy Thigpen Elliot; to be used for pastoral care of patients and members of their family, compassionate expense items and special events and services in the Hospital Chapel. | 2,992.13 |
| **Walker P. Inman Memorial Grant**<br>Established July 2, 1959 by bequest from Georgia Inman; the income to be used for furthering and promoting research into the subject of heart disease and other heart ailments. | 217,183.03 |
| **The Jones Chair of Engineering Fund**<br>Established 1951 by gifts from J. A. Jones Construction Company, Mr. Edwin L. Jones, '12, Mrs. Annabel Lambeth Jones, '12, Mr. Edwin L. Jones, Jr., '48, and Lucille Finch Jones, and supplemented by other gifts; the income to be used for the benefit of the College of Engineering as salaries, a professorship, scholarships or research. | 205,428.49 |
| **Henry Harrison Jordan Memorial Foundation**<br>Established 1947 by gifts from Mrs. George Way, B. Everett Jordan, '18, H. W. Jordan, Charles E. Jordan, '23, Mrs. H. C. Sprinkle, Jr., '24, and Frank B. Jordan, '27, children of Reverend Henry Harrison Jordan, of the residue of the estate of their father, supplemented by additional gifts; the income to be used for the support of the Ministers' Loan Library of the Duke Divinity School. | 49,835.82 |
| **Library Endowment Fund**<br>Established 1939 by contributions from a number of individuals in connection with the Centennial celebration of Duke University; the income to be used for the General Library of Duke University. | 4,363.11 |
| **Nellie McClees Fund**<br>Established 1963 by gift from Nellie McClees, '02; the income to be transferred annually to the Duke University Loyalty Fund. | 504.80 |
| **McDougall Reserve Fund**<br>Established 1957 by accumulated income in William McDougall Research Fund; to serve as a Reserve Fund for the benefit of the Duke University Parapsychology Laboratory. | 114,338.66 |
| **Medical School Research Fund**<br>Established 1939 by contributions from a number of individuals in connection with the Centennial celebration of Duke University; the income to be used for medical research. | 11,663.64 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **METHODIST COLLEGE ADVANCE FUND**<br>Established by contributions from the Western North Carolina Conference and the North Carolina Conference of the Methodist Church; the income to be used for scholarships for young men and women preparing for full time service in the work of religious education, and for a program of educational service to ministers already in the field. This plan would permit the use of the funds for special conferences, expansion of the Ministers' Loan Library, short-term winter courses, and other services, particularly to rural churches. | $ 47,504.68 |
| **ALBERT MILMOW PRIZE IN ELECTRICAL ENGINEERING**<br>Established 1935 by gift of Albert Milmow; the income to be used in providing annually a prize to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department, has made the most progress in electrical engineering during his last year in college. This prize consists of a certificate of award and one year's dues in the American Institute of Electrical Engineers. | 506.72 |
| **J. M. ORMOND FUND FOR THE TRAINING OF MINISTERS FOR THE RURAL CHURCH**<br>Established December 11, 1948 by gifts through the Methodist College Advance and supplemented subsequently by additional gifts; the income to be used to do research work in the rural church field of the North Carolina Conference of the Methodist Church of the Southeastern Conference. | 159,246.55 |
| **ORMOND MEMORIAL FUND**<br>Established 1924 by Dr. J. M. Ormond, '02, and Mrs. Ormond, in memory of his mother and father, Mr. and Mrs. J. J. Ormond; the income to be used for the purchase of a collection of books on the rural church for the Library of the Divinity School at Duke University. | 2,642.22 |
| **PUBLICATIONS SINKING FUND**<br>Established by the Publications Board of Duke University to serve as a reserve for the publications operated under its direction. | 55,299.17 |
| **THE JAMES B. RAST MEMORIAL AWARD FUND**<br>Established December, 1957 by Mr. and Mrs. W. B. Rast, in memory of their son, James Brailsford Rast, '58; the income to be used for an annual award to the student who demonstrates the greatest achievement in the study of Comparative Anatomy. | 2,668.45 |
| **THE BOB SEIBELS, JR., M.D. MEMORIAL LABORATORY FUND**<br>Established 1956 by bequest from Robert E. Seibels, M.D. for the purpose of establishing a Laboratory of Gynecological and Obstetrical Research at Duke University. | 30,856.38 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **William Senhauser Memorial Fund**<br>Established 1947 by gift of Mrs. Thomas E. Raymond in memory of her son. An award is made annually to the sophomore or junior who has made the greatest contribution through participation and leadership in intramural sports. | $ 2,628.01 |
| **The George Sherrerd, III Memorial Award in Electrical Engineering**<br>Established 1958 by gift from Mr. and Mrs. S. Donald Sherrerd, in memory of their son, George Sherrerd, III, '55; the income to be used for an annual award to the senior in Electrical Engineering who has attained the highest level of scholastic achievement in all subjects and simultaneously has rendered significant service to the College of Engineering and the University at large. | 5,338.31 |
| **The Hersey E. and Bessie Spence Chair in Christian Education**<br>Established 1963 by bequest from Hersey E., '07, and Bessie Spence, '06; the income to be used to establish a Chair in Christian Education. | 30,101.11 |
| **The Ettie Stettheimer Memorial Heart Research Fund**<br>Established 1957 by bequest of Ettie Stettheimer; the income to be used for research in the cause, treatment and prevention of heart disease. | 13,332.68 |
| **Francis Huntington Swett Memorial Award Fund**<br>Established 1951 by gift from Dr. George J. Baylin, '36; the income to provide an annual award to the most valuable basketball player. | 1,325.80 |
| **Hilda Howes Thomas Fund**<br>Established 1956 by gift from J. M. Thomas; the income to be used by the Music Department of Duke University to subsidize projects stimulating interest in the fine arts. | 4,661.93 |
| **William P. Tudor Fund**<br>Established 1956 by gift from William P. Tudor, '56; the income to be transferred annually, one-half to the General University Scholarship Fund and one-half to the Duke University Loyalty Fund. | 804.80 |
| **Gratton Williams Fund**<br>Established 1920 by bequest of Gratton Williams; the income to be used for the general purposes of Duke University, particularly for the development of the Library. | 2,531.46 |
| **Luther K. Williams Fund**<br>Established 1961 by gift of Luther K. Williams, '36; the income to be transferred annually to the Duke University Loyalty Fund. | 888.50 |
| **James J. Wolfe Memorial Fund**<br>Established 1921 by his friends and former students in memory of Dr. James J. Wolfe, Professor of Biology at Trinity College from 1904 until his death in June, 1920; the income to be used to purchase periodicals relating to biology. | 2,483.35 |

## Schedule B (Continued)—Endowed Special Funds

| | Book Value |
|---|---|
| **LIZZIE TAYLOR WRENN FOUNDATION FUND** | |
| Established 1921 by gift from Mrs. May Wrenn Morgan, '08, and her husband, John Allen Morgan, '06, in memory of Mrs. Morgan's sister, Lizzie Taylor Wrenn, '12; the income to be used for purchase of books for the Library of Duke University. | $ 1,892.61 |
| TOTAL | $2,840,541.87 |

## NOTE

Certain Endowed Special Funds established for the benefit of Duke University have independent trustees. The following is based on the report of the Trustee:

**FREDERIC M. HANES BEQUEST**

Wachovia Bank and Trust Company, Winston-Salem, North Carolina, Trustee of trust created under Will of Frederic M. Hanes for the benefit of the Unit of Duke University known as the Duke University Medical School and Hospital.

Total Book Value at the close of the Trust Year on May 8, 1963. $2,880,507.66

**FREDERIC M. HANES MEMORIAL TRUST**

Wachovia Bank and Trust Company, Winston-Salem, N. C. Trustee under agreement with Elizabeth P. Hanes for Frederic M. Hanes Memorial Trust of Duke University Medical School.

Total Book Value at the close of the Trust Year on June 1, 1963. $ 90,518.84

## SCHEDULE C—SCHOLARSHIP FUNDS

| | Book Value |
|---|---|
| **Fred Soule Aldridge—Durham County Alumni Scholarship Fund** | |
| Established December, 1947 by gift of Fred S. Aldridge, '96, and Mrs. Aldridge and includes subsequent contributions from the Durham County Alumni; the income to be used for scholarship aid, preference to be given to young men from Durham County. | $ 5,850.25 |
| **George G. Allen Scholarship Fund** | |
| Established July, 1947 by gift of George G. Allen; the income to be used for scholarship aid to deserving boys and girls from Warren County, N. C., and, under certain conditions, for other worthy students. | 132,028.63 |
| **Alumnae Scholarship Fund** | |
| Established May, 1940 by the Alumnae Association, in connection with the celebration of the Centennial of Duke University; the income to be used for scholarship aid to young women students of the Woman's College. | 4,508.97 |
| **Alumni Memorial Scholarship Fund** | |
| Established December, 1943 by several donors, in memory of alumni of Duke University who lost their lives during World War II; the income to be used for scholarship aid to worthy students. | 4,608.25 |
| **Atlanta Alumni Scholarship Fund** | |
| Established May, 1941 by gifts of members of the Alumni Association of Atlanta, Ga.; the income to be used for scholarship aid to worthy students. | 6,155.17 |
| **Mary Reynolds Babcock Divinity School Scholarship Fund** | |
| Established 1962 by gift from the Mary Reynolds Babcock Foundation; to be used for scholarship aid to Negro students in the Divinity School. | 1,400.00 |
| **Alice M. Baldwin Scholarship Fund** | |
| Established June, 1945 and supplemented from time to time by gifts from students and alumnae in honor of Alice M. Baldwin, Dean of the Woman's College, 1923-47; supplemented by a gift from the Class of 1951 of the Woman's College in memory of Bernice Lipscomb, '51, and Betsy Thorup, '51; and supplemented in 1958 by a gift from the Class of 1942 of the Woman's College; to be used for scholarship aid to undergraduate students in the Woman's College. | 66,388.48 |
| **Banks-Bradshaw Scholarship Fund** | |
| Established 1913 by gift of W. L. Banks and Mike Bradshaw, '78; the income to be used for scholarship aid to worthy students. | 2,529.19 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **EVELYN BARNES MEMORIAL SCHOLARSHIP FUND**<br>Established in 1953 in memory of Evelyn Barnes; the income to be used for scholarship aid to worthy students in the Woman's College. | $ 10,125.35 |
| **HERBERT J. BASS SCHOLARSHIP FUND**<br>Established 1900 by gift of Mr. and Mrs. Herbert J. Bass of Durham, N. C., in memory of their son, Herbert J. Bass, Jr.; the income to be used for scholarship aid to worthy students. | 2,926.43 |
| **MARY DUKE BIDDLE FOUNDATION SCHOLARSHIP FUND**<br>Established 1963 by gift from the Mary Duke Biddle Foundation; to be used for scholarships in the training of operating room nurses. | 3,000.00 |
| **WILLIAM M. BLACKBURN SCHOLARSHIP FUND**<br>Established 1962 by various contributions; the income to be used for scholarship aid to worthy students. | 1,727.86 |
| **EDGAR S. BOWLING SCHOLARSHIP FUND**<br>Established 1928 by gift of Edgar S. Bowling, '99, in memory of his sister, Mrs. Maye Bowling Bennett, '12; the income to be used for scholarship aid, preference to be given to boys and girls from Durham and adjoining counties. | 53,231.68 |
| **FRANKLIN BROWN FAMILY SCHOLARSHIP FUND**<br>Established 1954 by gift from Mr. W. Franklin Brown, '37, and Mrs. Louise Jones Brown, '38; the income to be used for scholarship aid to worthy undergraduate students. | 15,821.03 |
| **ELIZABETH CROWELL CARNES FOUNDATION SCHOLARSHIP FUND**<br>Established January, 1948 by bequest of Elizabeth Crowell Carnes, in memory of her parents, Jonas William Crowell and Virginia Vick Crowell; the income to be used for scholarship aid for young men and women of Duke University. | 7,359.98 |
| **CENTENNIAL SCHOLARSHIP FUND**<br>Established 1939 by gifts from several donors in connection with the Centennial celebration of Duke University; the income to be used for scholarship aid to worthy students. | 2,468.18 |
| **CHRISTIAN EDUCATION SCHOLARSHIP FUND**<br>Established by various contributions designated for scholarships in the Christian Education Movement, and includes contributions from Julian S. Carr, Mrs. Annie A. Foushee, C. T. Johnson, H. E. Myers, the Pegram Family, W. P. Suggs, E. T. White, Mr. and Mrs. J. C. Braswell and Mrs. R. C. Bruton, in memory of Alexander Walker, the alumni of Harnett County, and others; the income to be used for scholarship aid to worthy students. | 10,415.50 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **Class of 1906 Scholarship Fund**<br>Established July, 1937 by gifts from several members of the Class of 1906; the income to be used for scholarship aid to worthy students. | $ 1,518.72 |
| **Class of 1910 Scholarship Fund**<br>Established June 5, 1960 by several members of the Class of 1910; the income to be used for scholarship aid to worthy students. | 830.69 |
| **Class of 1912 Scholarship Fund**<br>Established by gifts from several members of the Class of 1912; the income to be used for scholarship aid to worthy students. | 985.57 |
| **Class of 1914 Scholarship Fund**<br>Established December, 1938 during the Centennial celebration of Duke University by various members of the Class; the income to be used for scholarship aid to worthy students, preference to be shown to descendants of the members of the Class of 1914. | 4,816.77 |
| **Class of 1917 Scholarship Fund**<br>Established August, 1952 by bequest of the Reverend R. Ernest Atkinson, '17; the income to be used for scholarship aid to needy young Methodist ministers while studying at Duke University. | 477.14 |
| **Class of 1918 Scholarship Fund**<br>Established by gifts from several members of the Class of 1918; the income to be used for scholarship aid to worthy students. | 585.32 |
| **The Cleland Scholarship Fund**<br>Established 1963 by gift of James T. and Alice Mead Cleland: the income to be used for scholarship aid to a designated senior Divinity student. | 7,129.98 |
| **E. M. Cole Foundation Fund**<br>Established 1920 by E. M. Cole, Charlotte, N. C.; the income to be used for scholarships for the benefit of students preparing for the ministry. | 29,407.95 |
| **Robert B. Cox Scholarship Fund**<br>Established 1949 by gift of Robert L. Wolf, '50, and supplemented from time to time by other gifts; the income to be used for scholarship aid for undergraduate men. | 7,205.50 |
| **Will L. Cuninggim Scholarship Fund**<br>Established 1934 by bequest of Mrs. W. L. Cuninggim, and supplemented by bequest of Mrs. Albert Bourne, in memory of Reverend Will L. Cuninggim, '77; the income to be used for scholarship aid, preference being given to graduates of the Methodist Orphanage, Raleigh, N. C. | 15,549.43 |
| **Rose M. Davis Scholarship Fund**<br>Established 1941 by Dr. Rose M. Davis, '16; the income to be used for scholarship aid. | 511.94 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **DIVINITY SCHOOL FOREIGN STUDENTS SCHOLARSHIP FUND** | |
| Established 1955 by contributions from various church agencies; to be used currently for scholarship aid to designated foreign students. | $ 674.94 |
| **DIVINITY SCHOOL MISCELLANEOUS SCHOLARSHIP FUND** | |
| Contributions by various churches and individuals for use currently for scholarship aid to designated individuals. | 39,499.67 |
| **JERE R. DOWNING SCHOLARSHIP FUND** | |
| Established 1936 by Mrs. Alice M. Downing and her son, J. Robert Downing, '35, as a memorial to their husband and father, Jere R. Downing of Kennebunk, Me.; the income to be used for scholarship aid, preference to be given to students from New England. | 2,253.93 |
| **B. N. DUKE SCHOLARSHIP FUND** | |
| Established 1939 by bequest of Mrs. Sarah P. Duke in memory of her husband, Benjamin N. Duke; comprised of one-half of the income earned by the bequest of Sarah P. Duke to the B. N. Duke Endowment Fund; to be used for scholarship aid to worthy and needy students of Duke University. | 27,675.23 |
| **JAMES B. DUKE 100TH ANNIVERSARY FUND** | |
| Established in 1956 by gift from The Duke Endowment, in recognition and commemoration of the one hundredth anniversary of the birth of James B. Duke; for the purpose of attracting and/or developing outstanding scholars in and through the Graduate School of Arts and Sciences at Duke University. | 1,770,742.16 |
| **DUKE UNIVERSITY SUNDRY SCHOLARSHIP FUND** | |
| Gifts by miscellaneous donors for current use as scholarships. | 12,641.29 |
| **N. EDWARD EDGERTON SCHOLARSHIP IN RELIGION FUND** | |
| Established May, 1940 by gift of N. Edward Edgerton, '21, of Raleigh, N. C.; to be used only for scholarship aid to candidates for the B.D. Degree in the Divinity School of Duke University. | 11,625.86 |
| **N. E. EDGERTON SCHOLARSHIP FUND** | |
| Established in January, 1953 by N. E. Edgerton, '21, through the Duke University Development Campaign; the income to be used for scholarship aid to worthy students, preference to be given to students from Wake County, North Carolina. | 17,100.08 |
| **ENGINEERING SCHOLARSHIP FUND** | |
| Established by gifts of various persons; to be used for scholarship aid to engineering students. | 362.90 |
| **WILLIAM P. FEW MEMORIAL SCHOLARSHIP FUND** | |
| Established 1942 by gifts from various persons and supplemented from time to time by other gifts; to be used for scholarship aid to worthy students. | 9,168.80 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **ARTHUR ELLIS FLOWERS SCHOLARSHIP FUND**<br>Established 1901 by Col. and Mrs. George W. Flowers, in memory of their son, Arthur Ellis Flowers; the income to be used for scholarship aid to worthy students. | $ 1,950.80 |
| **FRED FLOWERS SCHOLARSHIP FUND**<br>Established 1961 by bequest of Mr. Fred Flowers, '08; the income to be used for scholarship aid for worthy students. | 81,713.17 |
| **GEORGE W. FLOWERS SCHOLARSHIP FUND**<br>Established June, 1927 by Claude M. Flowers, '09, in memory of his father, Col. Geo. W. Flowers, for many years a Trustee of Trinity College; the income to be used for scholarship aid to needy and worthy students. | 9,753.31 |
| **R. L. FLOWERS TRUST SCHOLARSHIP FUND**<br>Established 1948 by bequest of Lily Parrish Flowers; the income to be used for scholarship aid for worthy students. | 106,187.25 |
| **FORESTRY SCHOOL SCHOLARSHIP FUND**<br>Established 1961 by gift from the Koppers Foundation; to be used for scholarship aid to students in the School of Forestry. | 800.00 |
| **SARA CLARKSON FOWLER SCHOLARSHIP FUND**<br>Established 1963 by gift from Henry B. Fowler, in memory of Sara Clarkson Fowler; the income to be used for scholarship aid to worthy students. | 505.22 |
| **GENERAL UNIVERSITY SCHOLARSHIP FUND**<br>Miscellaneous gifts from numerous persons; to be used currently for scholarship aid to worthy students. | 807.32 |
| **OTTIS GREEN FOUNDATION SCHOLARSHIP FUND**<br>Established 1951 by gift from Ottis Green, '97, and supplemented from time to time by other gifts; the income to be used to provide scholarships and fellowships for advanced study in the Graduate School of Duke University. | 53,883.29 |
| **GUILFORD COUNTY SCHOLARSHIP FUND**<br>Established 1941 by miscellaneous gifts of several persons; the income to be used for scholarship aid to worthy students. | 216.51 |
| **A. H. GWYN SCHOLARSHIP FUND**<br>Established May, 1951 by Judge A. H. Gwyn, '18; the income to be used for scholarship aid to worthy students. | 2,131.73 |
| **E. BAYARD HALSTED SCHOLARSHIP IN MEDICINE FUND**<br>Established 1961 by bequest of Mr. E. Bayard Halsted; the income to be used to enable a graduate of the Duke Medical School to pursue advanced studies in some branch of Medical Science. | 27,461.92 |
| **E. BAYARD HALSTED SCHOLARSHIPS IN SCIENCE, HISTORY AND JOURNALISM FUND**<br>Established 1961 by bequest of Mr. E. Bayard Halsted; the income to be used to enable a graduate of Duke University to pursue advanced studies in some branch of Science, History or Journalism. | 79,976.39 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **P. HUBER HANES SCHOLARSHIP FUND**<br>Established 1939, consisting of two-fifths of the income accruing annually to the P. Huber Hanes Fund; to be used for scholarship aid; two scholarships to members of the families of alumni; and two general scholarships. | $ 3,531.38 |
| **P. HUBER HANES, JR. SCHOLARSHIP FUND**<br>Established 1939, consisting of one-fifth of the income accruing annually to the P. Huber Hanes Fund; to be used for two scholarships for junior or senior students majoring in Business Administration. | 2,546.16 |
| **P. HUBER HANES DIVINITY SCHOOL SCHOLARSHIP FUND**<br>Established 1939, consisting of one-fifth of the income accruing annually to the P. Huber Hanes Fund; to be used for one scholarship in the Divinity School. | 1,324.26 |
| **J. WELCH HARRISS SCHOLARSHIP FUND**<br>Established May 23, 1950 by gift of J. Welch Harriss, '27, and supplemented subsequently by additional gifts; the income to be used for scholarships to deserving young men from High Point, N. C., entering the Freshman Class. | 45,921.92 |
| **B. D. HEATH SCHOLARSHIP FUND**<br>Established 1903 by B. D. Heath; to be used for scholarship aid to worthy students from Union County, N. C. | 5,528.79 |
| **HIGH POINT SCHOLARSHIP FUND**<br>Established by gifts of members of the High Point Alumni Association in connection with the celebration of the Centennial of Duke University; the income to be used for scholarship aid for students who are graduates of the High Point, N. C., High School. | 10,469.77 |
| **HOLCOMB SCHOLARSHIP FUND**<br>Established 1956 by gift from Dent Z. and Helen Holcomb; income to be used for scholarship aid to worthy students. | 11,302.98 |
| **HUNGARIAN STUDENTS SCHOLARSHIP FUND**<br>Established 1957 by gifts from students of Duke University; to be used for scholarship aid for Hungarian Refugee students. | 60.00 |
| **GEORGE M. IVEY SCHOLARSHIP FUND**<br>Established December 8, 1948 by gift of George M. Ivey, '20; the income to be used for scholarship aid for deserving students in the Divinity School. | 20,368.21 |
| **HUNTER JONES SCHOLARSHIP FUND**<br>Established December, 1947 by gift of Hunter Jones, '19, Durham, N. C.; the income therefrom to be used for scholarship aid to worthy students. | 7,025.65 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **HENRY HARRISON JORDAN MEMORIAL SCHOLARSHIP FUND**<br>Established December, 1938 by gifts from Mrs. George Way, B. Everett Jordan, '18, H. W. Jordan, Charles E. Jordan, '23, Mrs. H. C. Sprinkle, Jr., '24, and Frank B. Jordan, '27, in memory of their father, Reverend Henry Harrison Jordan, a member of the Western North Carolina Conference, and supplemented subsequently by additional gifts; the income to be used for scholarship aid to worthy students. | $ 34,004.94 |
| **J. M. JUDD SCHOLARSHIP FUND**<br>Established 1922 by Dr. J. M. Judd, '95, of Varina, N. C., with directions that the earnings be allowed to accumulate until such time as they are sufficient to provide a four-year tuition scholarship. | 4,207.06 |
| **GURNEY HARRISS KEARNS FOUNDATION FOR GRADUATE STUDY IN RELIGION FUND**<br>Established 1935 by gifts of Mr. and Mrs. Gurney Harriss Kearns, '97, High Point, N. C., supplemented by Amos R. Kearns, '27, and Charles L. Kearns, '32, and Katherine Kearns Cheek; the income to be used to promote advanced graduate study and research in religion primarily through the award of fellowships, but also to secure visiting lecturers and seminar leaders, and to award grants-in-aid to publish the more significant fruits of scholarly research in religion. | 190,826.25 |
| **W. K. KELLOGG FOUNDATION SCHOLARSHIP FOR TECHNICIANS FUND**<br>Established by contribution from the W. K. Kellogg Foundation; the entire sum to be used currently for scholarship aid to students preparing as medical technicians. | 1,750.00 |
| **LEWIS CLARENCE KERNER SCHOLARSHIP IN RELIGION FUND**<br>Established in May, 1959 by gift of Mrs. Beatrice Kerner Reavis in memory of her brother, Lewis Clarence Kerner; the income to be used for scholarship aid to worthy students of the Divinity School. | 23,997.44 |
| **FRANK S. LAMBETH SCHOLARSHIP FUND**<br>Established 1930 by bequest of Col. Frank S. Lambeth, '80; the income to be used for scholarship aid to worthy students of Duke University. | 1,974.07 |
| **LAURINBURG CHRISTIAN EDUCATION SCHOLARSHIP FUND**<br>Established December 11, 1948 by gift through the Methodist College Advance Fund; the income to be used for scholarship aid for worthy students of the Divinity School. | 9,475.28 |
| **LAW SCHOOL SCHOLARSHIP FUND**<br>Established 1950 by University appropriation and supplemented annually to provide scholarship aid to deserving students in the School of Law. | 4,040.00 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **WILLIAM S. LEE MEMORIAL SCHOLARSHIP FUND**<br>Established 1957 by gift from Mrs. W. S. Lee in memory of her late husband; the income to be used for scholarship aid for undergraduates in the Woman's College at Duke University. | $ 33,745.30 |
| **WILLIAM A. LEGGETT SCHOLARSHIP FUND**<br>Established in 1961 by gift of Leggett Memorial Fund; the income to be used for Nursing School Scholarships. If not used for this purpose, income to be transferred annually to the Duke University Loyalty Fund. | 1,691.68 |
| **D. M. LITAKER SCHOLARSHIP FUND**<br>Established 1946 by gift of Charles H. Litaker, '28, in memory of his father, Dr. D. M. Litaker, '90, who for 47 years was an active minister in the Methodist Church, and supplemented subsequently by additional gifts; the income and, under certain conditions, a part of the corpus of the fund to be used for scholarship aid for undergraduate students, natives of the territory now embraced by the Western North Carolina Conference who are preparing for the ministry. | 55,769.06 |
| **MARY ELIZABETH DUKE LYON SCHOLARSHIP FUND**<br>Established 1942 by Mrs. Mary Washington Stagg in memory of her mother, Mary Elizabeth Duke Lyon; the income to be used for scholarship aid for worthy students. | 10,409.60 |
| **THE MCALISTER SCHOLARSHIP FUND**<br>Established December, 1935 by Mrs. Amelie McAlister Upshur in memory of her mother, Armantine Reynaud McAlister, and father, William Henry McAlister; the income to be used annually for a scholarship for one boy and one girl from each of the three states of North Carolina, South Carolina and Louisiana. | 210,478.98 |
| **J. H. MCCRACKEN MEMORIAL SCHOLARSHIP FUND**<br>Established 1947 by Dr. J. H. McCracken, '22, and contributions from members of the First Methodist Church of Henderson, N. C., in memory of Reverend J. H. McCracken, '92, for many years a member of the North Carolina Conference; income to be used for scholarship aid. | 9,611.92 |
| **T. W. MCCRACKEN SCHOLARSHIP FUND**<br>Established 1945 by Thomas W. McCracken, '15; the income to be used for scholarship aid for worthy students. | 10,100.44 |
| **THE O. G. B. MCMULLAN SCHOLARSHIP FUND**<br>Established 1913 by gift of O. G. B. McMullan of Elizabeth City, N. C.; the income to be used for scholarship aid for worthy students, preference to be given to residents of Perquimans and Pasquotank Counties, N. C. | 2,688.12 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **The Louise and C. K. Massey Scholarship Fund**<br>Established 1953 by gift from C. Knox Massey and supplemented subsequently by additional gifts; to be used for scholarship aid to worthy students. | $ 4,950.80 |
| **R. A. Mayer Scholarship Fund**<br>Established 1939, in connection with the Centennial celebration of Duke University, by gift of R. A. Mayer, '96, in memory of his father, Minor C. Mayer, and mother, Sarah R. Mayer, and supplemented subsequently by additional gifts; the income to be used for scholarship aid for worthy students, preference to be given to students from Mecklenburg County, N. C. | 23,766.96 |
| **Medical School Scholarship Fund**<br>Established 1961 by gift from the Mary Duke Biddle Foundation; and supplemented subsequently by additional gifts to be used for scholarship aid to medical students. | 42,101.21 |
| **W. H. Moore Scholarship Fund**<br>Established 1920 in memory of Dr. W. H. Moore, '71, by his wife, Mrs. W. H. Moore, and daughters, Mrs. W. E. Steele, Miss Maude Moore, Mrs. T. L. Parsons, Mrs. J. H. Ihrie, and Mrs. J. LeGrand Everett; the income to be used for scholarship aid to worthy students. | 2,340.53 |
| **Thomas R. Mullen, Jr. Scholarship Fund**<br>Established April 5, 1949 by gift of T. R. Mullen in memory of his son and supplemented subsequently by additional gifts; the income to be used for scholarship aid for worthy young men and women. | 75,416.89 |
| **Myers Park Scholarship Fund**<br>Established 1948 by contributions of the members of the congregation of the Myers Park Methodist Church, Charlotte, N. C.; the income to be used for the benefit of the Divinity School. | 16,860.87 |
| **J. A. Odell Scholarship Fund**<br>Established 1897 by gift of James A. Odell; the income to be used for scholarship aid to worthy students. | 2,529.19 |
| **J. M. Odell Scholarship Fund**<br>Established 1897 by gift of Captain J. M. Odell; the income to be used for scholarship aid to worthy students. | 2,529.19 |
| **W. R. Odell Scholarship Fund**<br>Established 1940 by gifts from Fred C. Odell, '02, Mrs. Ralph M. Odell, Arthur G. Odell, '06, and supplemented from time to time by others, in memory of William R. Odell, '75, for more than 50 years a member of the Board of Trustees of Duke University; the income to be used for scholarship aid for worthy students. | 19,028.86 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **THE W. R. ODELL DIVINITY SCHOLARSHIP FUND** | |
| Established June, 1946 by members and friends of the Forest Hills Methodist Church, Concord, N. C., in memory of William R. Odell, '75; the income to be used for scholarship aid for students preparing for the Methodist ministry. | $ 11,402.42 |
| **HENRY A. PAGE SCHOLARSHIP FUND** | |
| Established January, 1942 by gift of Henry A. Page, Jr., '07, and Gertrude Wetherill Page, in memory of his father, Henry A. Page, for many years a member of the Board of Trustees of Duke University; the income to be used for scholarship aid to worthy students, preferably those preparing for the study of medicine. | 20,810.84 |
| **PARAPSYCHOLOGY SCHOLARSHIP FUND** | |
| Established 1960 by gifts from Chester F. Carlson, Dr. Marie R. Higbee and Clement and Stone Foundation through the William McDougall Research Fund; to be used for scholarship aid to students preparing for work in parapsychology. | 35,949.59 |
| **EDWARD JAMES PARRISH SCHOLARSHIP FUND** | |
| Established 1921 by Mrs. Rosa Brown Parrish, in memory of her husband, Edward J. Parrish, '67; the income to be used for scholarship aid to worthy students. | 1,950.80 |
| **POOLED INCOME—DIVINITY SCHOOL SCHOLARSHIP FUND** | |
| Established 1951 to consolidate the income of various Scholarship Funds which are restricted for the use of the Divinity School. | 11,023.72 |
| **PRE-MINISTERIAL SCHOLARSHIP FUND** | |
| Established 1960 by gift from Mr. and Mrs. William G. Pollard; to be used for scholarship aid to undergraduate students preparing for the ministry. | 150.00 |
| **W. N. REYNOLDS MEMORIAL SCHOLARSHIP FUND** | |
| Established 1961 by transfer from the W. N. Reynolds Loan Fund; the income to provide scholarships, to be awarded in the following order of preference, children of employees of R. J. Reynolds Tobacco Company, children of residents of Forsyth County, and residents of or natives of North Carolina. | 510,139.30 |
| **JOHN T. RING SCHOLARSHIP FUND** | |
| Established 1919 by gift of S. G. Ring and family of Kernersville, N. C., in memory of John T. Ring, '16, who was killed in France during World War I; the income to be used for scholarship aid for worthy students. | 2,340.53 |
| **T. V. ROCHELLE SCHOLARSHIP FUND** | |
| Established 1945 by T. V. Rochelle, '14, High Point, N. C.; the income to be used for scholarship aid for a worthy and needy student who is a graduate of the High Point, N. C., High School. | 10,142.78 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **GILBERT T. ROWE MEMORIAL SCHOLARSHIP FUND**<br>Established 1960 and supplemented from time to time by gifts from friends and alumni in memory of Professor Gilbert T. Rowe, '95, and by combining in 1963 the Winston-Salem District of Western N. C. Conference Loan Fund; the income to be used for scholarship aid to senior students of the Divinity School. | $ 21,083.24 |
| **ELBERT RUSSELL DIVINITY SCHOOL SCHOLARSHIP FUND**<br>Established 1943 and supplemented from time to time by gifts from friends and alumni of the Divinity School, in honor of Elbert Russell, Dean and Professor of Biblical Interpretation of the Divinity School, 1926-1945; the income to be used for scholarship aid for students preparing for the ministry in the Divinity School. | 9,433.99 |
| **SANDALS SCHOLARSHIP FUND**<br>Established 1955 by contribution from Sandals, for the purpose of providing scholarship awards to rising sophomores in the Woman's College of Duke University. | 1,441.25 |
| **ALEX. H. SANDS, JR. SCHOLARSHIP FUND**<br>Established 1956 by gifts from Alex. H. Sands, Jr.; to be used for scholarship aid to worthy students. | 9,564.30 |
| **JOSEPH H. SEPARK MEMORIAL SCHOLARSHIP FUND**<br>Established 1950 by gifts from friends in memory of Joseph H. Separk, '96, for many years a member of the Board of Trustees of Duke University; the income to be used for scholarship aid to worthy students, preference to be given to students from Gaston County, N. C. | 24,683.19 |
| **J. RAYMOND SMITH SCHOLARSHIP FUND**<br>Established 1939 by J. Raymond Smith, '17, Mt. Airy, N. C., in connection with the Centennial celebration of Duke University; the income to be used for scholarship aid to worthy students. | 16,409.41 |
| **WILLIS SMITH SCHOLARSHIP FUND**<br>Established 1939 by Willis Smith, '10, and supplemented from time to time by other gifts; the fund to be used for scholarship purposes. | 79,669.94 |
| **HERSEY EVERETT SPENCE SCHOLARSHIP FUND**<br>Established December, 1947 by gifts of members of the Methodist Church of Sanford, N. C., through the Methodist College Advance Fund, in honor of Hersey Everett Spence, '07, former pastor of that church and a member of the faculty of the Divinity School of Duke University; the income to be used for scholarship aid to deserving students in the Divinity School. | 9,325.11 |
| **WARREN C. AND PATTIE LEE STACK SCHOLARSHIP FUND**<br>Established 1962 by gift of Warren C. Stack; the income to be used for scholarship aid to worthy students attending the Duke University School of Law. | 614.64 |
| **THOMASVILLE SCHOLARSHIP FUND**<br>Established 1940 by gifts of T. Austin Finch, '09, and J. Walter Lambeth, '16, by contributions made through the Centennial Fund; the income to be used for scholarship aid for worthy students. | 2,437.49 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **MARY NEWBY TOMS SCHOLARSHIP FUND**<br>Established 1906 by gift of Clinton W. Toms and supplemented from time to time by additional gifts; in May, 1947, in connection with supplemental gifts to the Fund, it was established as a permanent endowment in memory of his wife, Mary Newby Toms; the income to be used for scholarship aid for worthy students; preference to be given to students from Durham and Perquimans Counties, N. C. | $ 194,045.38 |
| **HORACE TRUMBAUER MEMORIAL FUND**<br>Established 1955 by contribution from Mrs. Helena S. Fennessy and supplemented subsequently by additional gifts in memory of her father Horace Trumbauer; the income to be used for scholarship aid to worthy students, preference being given to students majoring in subjects which relate to the practice of Architecture. | 33,559.44 |
| **UNDERGRADUATE SCHOLARSHIP FUND**<br>Established 1950 to provide scholarship aid to deserving students in the undergraduate colleges of Duke University. Since 1951 this fund has been increased by the income from several Scholarship Funds which were not restricted in their use. | 23,977.36 |
| **THE WAGGONER SCHOLARSHIP FUND**<br>Established 1954 by contribution from T. R. Waggoner, '22, and supplemented subsequently by additional gifts in memory of his parents, Thomas Spencer Waggoner and Eva Barnwell Waggoner; the income to be used for scholarship aid for worthy undergraduate students. | 7,102.87 |
| **GEORGE W. WATTS SCHOLARSHIP FUND**<br>Established 1897 by gift of George W. Watts; the income to be used for scholarship aid to worthy students. | 2,529.19 |
| **WEATHERBY SCHOLARSHIP FUND**<br>Established 1912 by C. E. Weatherby, Faison, N. C.; the income to be used for scholarship aid to worthy students. | 2,529.19 |
| **BARBARA WERNER MEMORIAL SCHOLARSHIP**<br>Established August 7, 1959 by gift from Mr. and Mrs. Carl D. Werner in memory of their daughter, Barbara Werner, '59; the principal to be used for scholarship aid to worthy students in the Woman's College of Duke University. | 500.00 |
| **WEST CAMPUS CHEST SCHOLARSHIP FUND**<br>Established 1954 by the male undergraduate students of Duke University and supplemented annually for the purpose of providing scholarship awards to male students in residence in one of the undergraduate colleges. | 3,223.96 |
| **J. D. WHITE SCHOLARSHIP FUND**<br>Established 1962 by gift from White Foundation, Inc., to be used for scholarship aid annually to worthy students, preference being given to students from Davie County. | 500.00 |

## Schedule C (Continued)—Scholarship Funds

| | Book Value |
|---|---|
| **The Hillory M. Wilder Scholarship Fund**<br>Established 1962 by bequest from Celeste W. Blake and Kenneth M. Blake, in memory of Dr. Hillory M. Wilder; the income to be used for scholarship aid to capable, earnest young men and women of the white race and protestant faith who are residents of North Carolina and in need of financial assistance in the pursuit for study for the medical profession. | $ 152,475.24 |
| **Florence K. Wilson Scholarship Fund**<br>Established 1955 by contribution from students of the School of Nursing, and by combining in 1961 the Duke Nurses Alumnae Association Scholarship and supplemented by gifts from the Wilson family and friends; the income to be used for scholarships for students in the School of Nursing. If the income from the fund is not used for scholarship purposes for the School of Nursing it may be transferred to the Loyalty Fund. | 12,487.32 |
| **Woman's College Foreign Students Scholarship Fund**<br>Established 1956 by gifts from students of the Woman's College of Duke University; supplemented by a gift from the Class of 1959 of the Woman's College in memory of Barbara Werner; the income to be used for scholarship aid to worthy students from other countries studying at the Woman's College of Duke University. | 11,526.68 |
| **Woman's Panhellenic Scholarship Fund**<br>Established May 25, 1949 by gift of the Woman's College Panhellenic Association; income to be used for scholarship aid for a rising senior in the Woman's College of Duke University. | 4,644.32 |
| **B. S. Womble Scholarship Fund**<br>Established 1961 by gifts from Edith S. Womble, Lila W. Jenkins, '35, William F. Womble, '37, Olivia W. Long, '39, Edith W. Chatham, '40, Calder W. Womble, '43, Ruth W. Lee, '49, and subsequent gift of Mr. B. S. Womble, '04; the income to be used for scholarship aid to worthy students in the Duke University Law School. | 18,335.68 |
| TOTAL | $ 4,805,078.66 |

## NOTE

Certain Scholarship Funds established for the benefit of students of Duke University have independent trustees. The following information is furnished by the trustee:

**Mary Alyse Smith Scholarship Fund**

"Established December, 1946 by Mary Alyse Smith, '30, of Burlington, North Carolina, now Mrs. Wilbur Cooper, and her father, Marvin (deceased 1952), with Central Carolina Bank & Trust Company as Trustee: supplemented in 1947, 1948, 1957 and 1958 by Mary Alyse Smith. Income to be used for scholarship aid to worthy North Carolina boys or girls entering the Freshman Class."

Book Value, June 30, 1963. $21,734.74

## SCHEDULE D—STUDENT LOAN FUNDS

| | Book Value |
|---|---|
| **ALOE CHARITABLE TRUST LOAN FUND FOR STUDENTS IN HOSPITAL ADMINISTRATION**<br>Established 1962 by gift of Aloe-Medical Division of Brunswick; to be used for loans to students in the graduate courses in hospital administration at Duke University. | $ 6,000.00 |
| **ALUMNI LOAN FUND**<br>Established 1915 by gift from the Alumni Association. | 1,512.97 |
| **ALBERT ANDERSON LOAN FUND**<br>Established in 1952 by accumulation of the income from the bequest of Albert Anderson, '83, for current use in aiding and assisting in the education of worthy and deserving young men and women of the Methodist faith. | 22,138.10 |
| **DENIS CAMPBELL ANDREWS ORTHOPAEDIC LOAN FUND**<br>Established 1961 by gift of Mrs. Nancy Long; to be used for loans to medical students. | 1,000.00 |
| **VIRGINIA FLOWERS BAKER ORTHOPAEDIC LOAN FUND**<br>Established 1958 by gift of Dr. Lenox Baker, M.D., '34; to be used for loans to students in orthopaedic surgery. | 1,489.38 |
| **CHARLES WHITLOCK BANNER LOAN FUND**<br>Established 1953 by gift from Mrs. Edward B. Benjamin; the income to be used for loans to medical students. | 2,133.90 |
| **PAUL M. BARRINGER BEQUEST FUND**<br>Established 1932 by bequest from Paul M. Barringer; the income to be used in educating worthy young people, preference to be given those from Rowan County, N. C. | 21,816.22 |
| **BYNUM BELOTE LOAN FUND**<br>Established 1924 by E. T. Belote of Asheville, N. C., in memory of his son, Alfred Bynum Belote, student, 1923-24. | 4,600.60 |
| **A. D. BETTS LOAN FUND**<br>Established 1919 by Reverend G. W. Vick, '11, and wife, in memory of Reverend A. D. Betts, a member of the North Carolina Conference; other contributions by Reverend W. A. Betts and Mrs. L. P. Wilkins; to be used for the aid of young men preparing for the ministry. | 2,439.09 |
| **ANNE BLECK ORTHOPAEDIC LOAN FUND**<br>Established 1959 by gift of E. E. Bleck, M.D.; to be used for loans to students in orthopaedic surgery. | 825.00 |
| **FANNIE CARR BIVINS MEMORIAL LOAN FUND**<br>Established 1928 by the Alumnae Association, in memory of Fannie Carr Bivins, '96; income to be loaned to young women students upon the recommendation of the Alumnae Council and approval by the Dean of Women. | 5,008.70 |

## Schedule D (Continued)—Student Loan Funds

| | Book Value |
|---|---|
| **Branson Loan Fund**<br>Established 1953 by bequest of Mrs. Clara S. Odell; the income to be used for loans to needy students. | $ 7,452.00 |
| **Christian Education Loan Fund**<br>Established 1921 as a part of the Christian Education movement of the Methodist Church in North Carolina; for use as a general loan fund. | 2,331.70 |
| **Class of 1902 Loan Fund**<br>Established 1932 by the members of the class at their 30th Anniversary Reunion. | 953.96 |
| **Jesse A. Cuninggim Loan Fund**<br>Established 1896 by Reverend J. A. Cuninggim, '90; to be loaned to young men preparing for the ministry. | 22,719.20 |
| **J. B. Duke Church Extension Loan Fund**<br>Established 1925 by gift from James B. Duke; to be used for the aid of young men preparing for the ministry. | 10,601.76 |
| **Alexander Edens Memorial Loan Fund**<br>Established 1920 by Lacy T. Edens, '24, Cora R. Edens, John A. Edens, L. D. Edens, '15, and L. F. Edens, in memory of Alexander Edens. | 4,169.02 |
| **School of Forestry Loan Fund**<br>Established 1940 by gifts of various persons; to be used for the aid of students in the School of Forestry. | 1,409.19 |
| **General Loan Fund**<br>Established 1900 by the North Carolina Conference and supplemented from time to time by additional contributions by both the North Carolina Conference and the Western North Carolina Conference; to be used for no other purpose than to aid worthy students of the University. | 77,197.00 |
| **W. O. Goode Educational Loan Fund**<br>Established 1923 by Reverend W. O. Goode of the Western North Carolina Conference. | 1,829.58 |
| **Mary Hester Hambrick Loan Fund**<br>Established 1925 by W. R. Hambrick, Haldah Satterfield, John Jackson Hambrick, '16, and Dr. Robert T. Hambrick, '19, in memory of Mary Hester Hambrick, wife and mother; loans to be made to any needy students, preferably from Person County, N. C. | 2,565.91 |
| **F. M. Hanes Graduate Medical Loan Fund**<br>Established in December, 1952 by transfer from the Current Restricted "F. M. Hanes Bequest to the School of Medicine Fund"; to be used for loans to Post-Graduate Medical Students. | 153,501.16 |

## Schedule D (Continued)—Student Loan Funds

| | Book Value |
|---|---|
| **P. Frank Hanes Loan Fund**<br>Established 1934 by P. Frank Hanes, '11; administered by a Loan Fund Committee of the Law School; loans to needy and deserving law students. | $ 3,819.20 |
| **B. D. Heath Loan Fund**<br>Established 1921 by B. D. Heath of Charlotte, N. C.; income to be used for students preparing for the ministry, preference to be given to one student annually from Union County, N. C. | 13,867.31 |
| **Holmes-McCausland Loan Fund**<br>Established 1946 by gifts of Alfred M. McCausland and Frances Holmes McCausland, '26, in memory of their parents; the principal or income to be used for loans to students in the Divinity School. | 16,075.70 |
| **Holland Holton Memorial Loan Fund**<br>Established March, 1948 by friends and former students in memory of Holland Holton, '07, Professor of Education and Director of the Summer School of Duke University for many years; to be used in helping worthy young men and women in securing a college education. | 5,671.92 |
| **J. B. Ivey Loan Fund**<br>Established 1922 by J. B. Ivey of Charlotte, N. C.; to be used for loans to worthy students. | 3,587.20 |
| **W. K. Kellogg Foundation Loan Fund for Medical Students**<br>Established 1942 by gift of the W. K. Kellogg Foundation; to be used for loans to medical students. | 19,811.03 |
| **W. K. Kellogg Foundation Loan Fund for Medical Technology**<br>Established 1943 by gift of the W. K. Kellogg Foundation; to be used for loans to students in the field of medical technology. | 2,072.48 |
| **W. K. Kellogg Foundation Loan Fund for Nurses**<br>Established 1942 by gift of the W. K. Kellogg Foundation; to be used for loans to students in the School of Nursing. | 3,428.87 |
| **W. K. Kellogg Foundation Loan Fund for Physical Therapy**<br>Established 1943 by gift of the W. K. Kellogg Foundation; to be used for loans to students receiving training in physical therapy. | 4,243.37 |
| **W. K. Kellogg Foundation Loan Fund for Students in Hospital Administration**<br>Established 1962 by gift from W. K. Kellogg Foundation; to be used for loans to graduate students in hospital administration at Duke University. | 10,004.00 |
| **Masonic Loan Fund**<br>Established 1923 by the North Carolina Masonic Educational Loan Fund Committee; to be used for aid to worthy students. | 833.65 |

## Schedule D (Continued)—Student Loan Funds

| | Book Value |
|---|---|
| **Medical Freshman Tuition Loan Fund**<br>Established August 28, 1960 by gift from Dr. George W. Brumley, Jr., '56, and Mrs. Jean Stanback Brumley, '58; to be loaned to freshmen in the School of Medicine. | $ 5,693.07 |
| **Medical Post-Graduate Loan Fund**<br>Established in August, 1954 by transfer from Current Restricted "F. M. Hanes Bequest to the Department of Medicine Fund"; to be used for loans to post-graduate students in medicine. | 86,138.58 |
| **Medical Students Loan Fund**<br>Established 1941 by gifts of various persons. | 482.31 |
| **George W. Merck Memorial Loan Fund**<br>Established 1963 by gift from the Merck Company Foundation; to be used for loans to post-graduate students in the Duke University school of medicine. | 3,000.00 |
| **Ministerial Education Loan Fund**<br>Established 1915 by the North Carolina Conference of the Methodist Church; to be used for loans to students preparing for the ministry. | 4,434.19 |
| **William Neal Student Aid Fund**<br>Established 1920 by John W. Neal in memory of his son, William Neal, student in 1919; to be used for loans to worthy and needy students. | 4,180.11 |
| **North Carolina Conference Board of Christian Education Loan Fund**<br>Established 1931 by gift of the Board of Christian Education of the North Carolina Conference; to be used for loans to students preparing for the ministry or other distinctive type of Christian service. | 7,831.22 |
| **Marsha Paulk Memorial Loan Fund**<br>Established 1958 by gifts from the students of the Duke University School of Physical Therapy and friends of Marsha Paulk; to be used for loans to full-time students enrolled in the School of Physical Therapy. | 986.80 |
| **Henry Simpson Proctor Loan Fund**<br>Established 1957 by gift from Mrs. A. M. Proctor, Mrs. Alberta Proctor Hyde, Mrs. Julia Proctor Makosky and Hugh W. Proctor, in memory of Arthur Marcus Proctor, '10; the income to be used for aid to graduate students in the Department of Education. | 6,873.81 |
| **Psychiatry Loan Fund**<br>Established 1956 by transfer from Psychiatry Department Operating Fund; to be used for loans to post-graduate students in Psychoanalysis. | 13,857.04 |

## Schedule D (Continued)—Student Loan Funds

| | BOOK VALUE |
|---|---|
| **W. N. REYNOLDS LOAN FUND**<br>Established by W. N. Reynolds, '86, of Winston-Salem, N. C.; to be used for loans to boys and girls of North Carolina seeking an education at Duke University; preference, however, to be given to the children of employees of the R. J. Reynolds Tobacco Company, regardless of residence. | $ 164,357.65 |
| **ROANOKE RAPIDS HIGH SCHOOL LOAN FUND**<br>Established 1925 by the graduating class of the Roanoke Rapids High School, Roanoke Rapids, N. C.; to be used for loans to students who are graduates of that school. | 738.57 |
| **SCOTT LOAN FUND**<br>Established in October, 1952 by I. M. Scott, '32, and supplemented subsequently by additional gifts; to be used for loans to Medical students. | 4,736.38 |
| **MARIAN SANFORD SEALY LOAN FUND**<br>Established April 27, 1960 by gift from the Durham-Orange County Medical Auxiliary of Durham, North Carolina and supplemented by various other gifts in memory of the late Marian Sanford Sealy, '59; the principal as well as any interest earned thereon to be used for loans to full time graduate and undergraduate students in the School of Nursing who are legal and bona fide residents of the state of North Carolina. | 2,946.97 |
| **THE COLONEL HAMILTON FOLTS SEARIGHT LOAN FUND**<br>Established 1957 by gift from Mrs. Louise Searight Morell, '42; to be used for the aid of students pursuing a science curriculum. | 521.93 |
| **JOSEPH F. STEIN STUDENT LOAN FUND**<br>Established 1961 by gifts of Mr. Joseph F. Stein to the Duke University School of Nursing; to be used for loans to students in the School of Nursing. | 4,252.88 |
| **SURGICAL POST-GRADUATE LOAN FUND**<br>Established 1954 by transfer from the Department of Surgery Fund; to be used for loans to post-graduate students in surgery. | 5,002.16 |
| **ELLA WESCOTT TUTTLE LOAN FUND**<br>Established 1923 by Reverend D. H. Tuttle, '80, in memory of his wife, Ella Wescott Tuttle; to be used for loans to worthy young women seeking an education at Duke University. | 4,188.97 |
| **JOSHUA VICK MEMORIAL LOAN FUND**<br>Established 1920 by Mrs. J. W. Vick in memory of her husband, Joshua Vick; to be used for loans to needy students. | 1,948.85 |
| **WAKE COUNTY ALUMNAE LOAN FUND**<br>Established 1924 by the Raleigh Chapter of the Alumnae Association; to be used for loans to worthy women students. | 3,407.28 |

## Schedule D (Continued)—Student Loan Funds

| | Book Value |
|---|---|
| **Henry Carson West Loan Fund**<br>Established 1954 by gift from H. Carson West, '17, and supplemented subsequently by additional gifts; to provide loans for upper-classmen from North Carolina. | $ 1,409.52 |
| **Lucy T. Woolard Medical Loan Fund**<br>Established 1962 in memory of Lucy T. Woolard by her daughters, Wylma, Rachel, and Margaret Woolard and Thelma Soloway; the principal and income to be used for loans to interns and residents in the Duke University Medical Center whose interests include the study of diseases of the blood. | 1,006.67 |
| **Mary Poage Wooten Loan Fund**<br>Established 1922 by Reverend John C. Wooten, '98, in memory of his wife, Mary Poage Wooten; to be used for loans to worthy students. | 2,231.86 |
| TOTAL | $ 767,335.99 |

## NOTE

Certain Endowed Loan Funds established for the benefit of students of Duke University have independent trustees. The following is based on the report of the Trustee:

**Albert Anderson Bequest**

Wachovia Bank and Trust Company, Raleigh, North Carolina, Trustee of trust created under Will of Albert Anderson for use as a Loan Fund to Methodist Students attending Duke University.

Total Book Value at the close of the Trust Year on March 27, 1963. $29,742.60

# SCHEDULE E—CURRENT RESTRICTED FUNDS

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| **Air Force:** | | | | |
| Contract AF 01 (611) 1100 | $ 553.60* | $ 1,344.41 | $ 790.81 | $ |
| Contract AF 01 (611) 1258 | ..... | 1,089.66 | 1,409.95 | 320.29* |
| Contract AF 33 (616) 6803 | 5,781.22* | 11,655.91 | 7,268.03 | 1,393.34* |
| Contract AF 33 (657) 8854 | 727.75* | 11,481.33 | 13,566.35 | 2,812.77* |
| Contract AF 33 (657) 10279 | ..... | ..... | 1,561.31 | 1,561.31* |
| Contract AF 41 (609) 1999 | ..... | ..... | 46.30 | 46.30* |
| Contract AF 41 (657) 312 | 4,190.33* | 19,871.01 | 28,149.54 | 12,468.86* |
| Contract AF 41 (657) 368 | 2,761.93* | 6,234.47 | 3,509.46 | 36.92* |
| Contract AF 49 (638) 354 | 766.83 | 4,266.58 | 5,141.56 | 108.15* |
| Contract AF 49 (638) 765 | 30,641.11* | ..... | 51.57 | 30,692.68* |
| Grant AF-AFCSR-57-63 | ..... | 24,776.00 | 16,187.67 | 8,588.33 |
| Grant AF-AFOSR-61-51 | 11,076.43 | ..... | 8,563.68 | 2,512.75 |
| Grant AF-AFOSR-62-162 | ..... | 30,990.00 | 3,721.76 | 27,268.24 |
| Grant AF-AFOSR-62-164 | 12,050.00 | ..... | 7,998.93 | 4,051.07 |
| Grant AF-AFOSR-62-327 | 38,352.18 | 75,590.00 | 87,114.03 | 26,828.15 |
| **Army:** | | | | |
| Contract DA-18-064-404-CML-170 | 7,202.92* | 7,706.82 | 7,791.27 | 7,287.37* |
| Contract DA-31-124-ARO-D-6 | 1,307.46* | 3,492.30 | 9,189.63 | 7,004.79* |
| Contract DA-31-124-ARO-D-10 | 4,706.50* | 17,504.77 | 14,832.20 | 2,033.93* |
| Contract DA-31-124-ARO-D-13 | ..... | 68,009.28 | 92,626.86 | 24,617.58* |
| Contract DA-31-124-ARO-D-19 | ..... | 14,072.94 | 16,792.71 | 2,719.77* |
| Contract DA-31-124-ARO-D-20 | ..... | 344.00 | 1,788.59 | 1,444.59* |
| Contract DA-31-124-ARO-D-48 | ..... | 32,501.02 | 48,672.19 | 16,171.17* |
| Contract DA-31-124-ARO-D-49 | ..... | 36,495.98 | 92,572.06 | 56,076.08* |
| Contract DA-31-124-ARO-D-50 | ..... | ..... | 2,840.34 | 2,840.34* |
| Contract DA-31-124-ARO-D-59 | ..... | 3,102.14 | 4,499.64 | 1,397.50* |
| Contract DA-31-124-ARO-D-60 | ..... | ..... | 2,364.68 | 2,364.68* |
| Contract DA-31-124-ARO-D-100 | ..... | ..... | 940.06 | 940.06* |
| Contract DA-31-124-ARO-D-120 | ..... | ..... | 120.40 | 120.40* |
| Contract DA-21-134-ARO-D-122 | ..... | ..... | 990.90 | 990.90* |
| Contract DA-31-124-ORD-1 | 50,850.30* | 255,031.94 | 268,291.21 | 64,109.57* |
| Contract DA-31-124-ORD-5 | 699.50* | ..... | 5,239.03 | 5,938.53* |
| Contract DA-31-124-ORD-7 | 1,865.20* | 17,018.24 | 16,203.04 | 1,050.00* |
| Contract DA-31-124-ORD-10-2 | ..... | ..... | 1,326.65 | 1,326.65* |
| Contract DA-31-124-ORD-10-4 | 138,287.96* | 310,144.05 | 504,696.51 | 332,840.42* |
| Contract DA-31-124-ORD-10-5 | 750.00* | 5,803.67 | 6,950.77 | 1,897.10* |
| Contract DA-31-124-ORD-10-6 | 675.85* | 675.85 | ..... | ..... |
| Contract DA-31-124-ORD-10-7 | 96.38* | 115.41 | 19.03 | ..... |
| Contract DA-31-124-ORD-10-8 | 13,327.92* | 30,760.03 | 17,393.88 | 38.23 |
| Contract DA-31-124-ORD-10-11 | ..... | 1,155.44 | 9,240.39 | 8,084.95* |
| Contract DA-31-124-ORD-10-12 | 364.50* | 26,972.71 | 42,041.29 | 15,433.08* |
| Contract DA-36-034-ORD-1535(Math) | 14,653.22* | 14,653.22 | ..... | ..... |
| Contract DA-36-034-ORD-2040 | 8,952.69* | 19,616.37 | 13,898.51 | 3,234.83* |
| Contract DA-36-034-ORD-2590-RD | 262.39* | 262.39 | ..... | ..... |
| Contract DA-36-034-ORD-2773RD | 855.77* | 946.38 | 90.61 | ..... |
| Contract DA-36-034-ORD-2864RD | 6,803.10* | 6,332.10 | ..... | 531.00* |
| Contract DA-36-034-ORD-2918RD | ..... | 91.37 | 91.37 | ..... |
| Contract DA-49-193-MD-2153 | 2,800.09* | 20,091.31 | 18,980.70 | 1,689.48* |
| Grant DA-AROD-31-124-G128 | 3,287.24 | ..... | 3,033.74 | 253.50 |
| Grant DA-AROD-31-124-G143 | .01 | ..... | .01 | ..... |
| Grant DA-AROD-31-124-G202 | 8,041.97 | 15,763.00 | 8,250.08 | 15,554.89 |
| Grant DA-AROD-31-124-G303 | 9,259.84 | 10,265.00 | 16,875.30 | 2,649.54 |
| Grant DA-AROD-31-124-G332 | 16,442.00 | 32,831.50 | 41,443.34 | 7,830.16 |
| Grant DA-AROD-31-124-G354 | ..... | 32,633.00 | 28,101.69 | 4,531.31 |
| Grant DA-AROD-31-124-G378 | ..... | 25,690.00 | 18,563.05 | 7,126.95 |
| Grant DA-AROD-31-124-G409 | ..... | 16,889.15 | 3,880.72 | 13,008.43 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant DA-AROD-31-123-G428 | ..... | 32,516.80 | 19,203.97 | 13,312.83 |
| Grant DA-ORD-4 | 81.10 | ..... | 114.82 | 33.72* |
| Grant DA-ORD-19-066-60-G20 | 856.71 | ..... | ..... | 856.71 |
| Grant DA-ORD-19-066-61-031 | 131.52 | 285.08 | 416.60 | ..... |
| Grant DA-ORD-19-066-62-G66 | 36,000.00 | ..... | 36,000.00 | ..... |
| Grant DA-ORD-31 | 1,938.64* | 11.10 | ..... | 1,927.54* |
| Grant DA-ORD-31-124-60-G63 | 2,509.88 | ..... | 924.17 | 1,585.71 |
| Grant DA-ORD-31-124-61-G35 | 177.55* | 177.55 | ..... | ..... |
| Grant DA-ORD-41 | 5,336.18 | ..... | 5,195.73 | 140.45 |
| Atomic Energy Commission: | | | | |
| Contract AT (40-1) 289 No.2 | 1,900.00* | 1,900.00 | ..... | ..... |
| Contract AT (40-1) 1067 No.3 | 54,730.24* | 260,097.91 | 282,615.62 | 77,247.95* |
| Contract AT (40-1) 1647 | 1.60 | 6.38 | ..... | 7.98 |
| Contract AT (40-1) 1827 | 6,911.28 | 7,716.50 | 13,024.28 | 1,603.50 |
| Contract AT (40-1) 2002 | 5,058.89 | 6,614.30 | 8,310.17 | 3,363.02 |
| Contract AT (40-1) 2059 | 782.79 | ..... | 771.58 | 11.21 |
| Contract AT (40-1) 2430 | 25,085.25 | 96,216.50 | 87,458.38 | 33,843.37 |
| Contract AT (40-1) 2479 | 2,351.66 | 1,627.50 | 610.94 | 3,368.22 |
| Contract AT (40-1) 2790 | 9,140.08 | 18,177.80 | 16,657.60 | 10,660.28 |
| Contract AT (40-1) 2919 | 6,449.95 | 22,952.90 | 20,861.52 | 8,541.33 |
| Contract AT (40-1) 3065 | ..... | 63,900.00 | 40,466.05 | 23,433.95 |
| Contract AT (40-1) 3094 | ..... | 4,109.85 | 737.63 | 3,372.22 |
| Contract BM-15-6-63 | ..... | 7,125.00 | ..... | 7,125.00 |
| Contract BM-16-36-63 | ..... | 9,973.00 | 67.32 | 9,905.68 |
| Grant BM-13-43-62 | 1,731.63 | ..... | 1,731.63 | ..... |
| National Aeronautics Space Administration: | | | | |
| Contract NAS 5-1980 | 12,277.39* | ..... | 3,560.36 | 15,837.75* |
| Grant NSG-152-61 | 22,645.76 | 42,348.00 | 45,689.27 | 19,304.49 |
| Grant NSG-251-62 | 3,533.27 | 4,575.00 | 8,067.23 | 41.04 |
| Grant NSG T-16 | ..... | 59,000.00 | ..... | 59,000.00 |
| National Science Foundation: | | | | |
| Cooperative Graduate Fellowship Program | 11,470.83 | 20,425.00 | 28,193.08 | 3,702.75 |
| Graduate Fellowship Grant | ..... | 14,550.00 | 2,166.66 | 12,383.34 |
| Summer Teaching Fellowship Grant | 2,084.40 | 2,851.20 | 3,164.00 | 1,771.60 |
| Grant G-5600 | 4.40* | 4.40 | ..... | ..... |
| Grant G-6151 | 2,682.44* | 8,300.00 | 5,617.56 | ..... |
| Grant G-6359 | 23,961.12 | ..... | 23,961.12 | ..... |
| Grant G-7079 | 2,653.25 | ..... | 2,653.25 | ..... |
| Grant G-7178 | 387.99* | 387.99 | ..... | ..... |
| Grant G-7464 | 7,674.50 | 2,010.47 | 9,684.97 | ..... |
| Grant G-8243 | 779.38* | 779.38 | ..... | ..... |
| Grant G-8788 | 34.24* | 34.24 | ..... | ..... |
| Grant G-8857 | 167.48 | ..... | 167.48 | ..... |
| Grant G-8858 | 2,967.71 | ..... | 2,967.71 | ..... |
| Grant G-9112 | 2,825.94 | ..... | 4,435.89 | 1,609.95* |
| Grant G-9610 | 46.54 | ..... | 46.54 | ..... |
| Grant G-9841 | 8,169.77 | ..... | 8,169.77 | ..... |
| Grant G-10109 | 37.29 | ..... | 37.29 | ..... |
| Grant G-10730 | 5,527.49 | 2,893.02 | 8,420.51 | ..... |
| Grant G-11401 | 5,546.89 | ..... | 5,546.89 | ..... |
| Grant G-11774 | 3,651.56 | ..... | 3,651.56 | ..... |
| Grant G-12453 | 6,376.54 | ..... | 6,376.54 | ..... |
| Grant G-12707 | 2,113.26 | 502.71 | 2,615.97 | ..... |
| Grant G-12888 | 6,821.57 | 8,120.25 | 14,941.82 | ..... |
| Grant G-13129 | 10,272.50 | ..... | 10,272.50 | ..... |
| Grant G-13177 | 5,521.65 | 5,830.27 | 11,163.82 | 188.10 |
| Grant G-13194 | 1,541.27 | 5,180.37 | 6,501.64 | 220.00 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant G-13215 | 23,534.92 | ..... | 23,535.12 | .20* |
| Grant G-13234 | 4,091.82 | ..... | 4,091.82 | ..... |
| Grant G-13310 | 48.37* | 48.37 | ..... | ..... |
| Grant G-13593 | 388.07 | ..... | 388.07 | ..... |
| Grant G-13952 | 5,836.70 | ..... | 5,836.70 | ..... |
| Grant G-13954 | 14,674.34 | 428.68 | 15,103.02 | ..... |
| Grant G-14051 | 14,885.82 | ..... | 14,898.92 | 13.10* |
| Grant G-14527 | 18,986.32 | 953.35 | 19,939.67 | ..... |
| Grant G-14636 | 8,883.59 | 17,421.17 | 26,304.76 | ..... |
| Grant G-14741 | 10,334.29 | 735.25 | 11,069.54 | ..... |
| Grant G-14986 | 4,506.44 | ..... | 5,964.32 | 1,457.88* |
| Grant G-16189 | 5,355.70 | ..... | 5,429.40 | 73.70* |
| Grant G-16255 | 11,215.78 | ..... | 11,215.78 | ..... |
| Grant G-16484 | 13,152.25 | 1,279.91 | 14,432.16 | ..... |
| Grant G-16485 | 16,432.93 | ..... | 16,432.93 | ..... |
| Grant G-16567 | 44.96 | ..... | 44.96 | ..... |
| Grant G-16842 | 13,266.19 | 2,406.55 | 15,672.74 | ..... |
| Grant G-17081 | 12,321.33 | 10,544.97 | 22,866.30 | ..... |
| Grant G-17230 | 5,128.03 | 2,036.00 | 7,164.03 | ..... |
| Grant G-17477 | 6,028.84 | 7,025.17 | 12,975.01 | 79.00 |
| Grant G-17619 | 2,157.10 | 2,600.00 | 5,498.00 | 740.90* |
| Grant G-17669 | ..... | 20,246.31 | 20,246.31 | ..... |
| Grant G-18098 | 18,501.51* | 26,972.58 | 8,427.07 | 44.00 |
| Grant G-18124 | 8,651.80 | 16,134.97 | 24,703.77 | 83.00 |
| Grant G-18535 | 7,048.29 | ..... | 7,048.29 | ..... |
| Grant G-18799 | 9,340.00 | ..... | 9,340.00 | ..... |
| Grant G-19060 | 3,034.37 | ..... | 3,034.37 | ..... |
| Grant G-19098 | 585.08 | 3,821.05 | 4,336.13 | 70.00 |
| Grant G-19537 | 3,413.11 | 2,368.91 | 5,782.02 | ..... |
| Grant G-19716 | 7,600.04 | 19,000.00 | 26,600.04 | ..... |
| Grant G-19761 | 4,962.73* | 26,012.39 | 21,049.66 | ..... |
| Grant G-19849 | 8,125.61 | 13,559.37 | 21,668.98 | 16.00 |
| Grant G-19899 | 824.48 | 3,535.25 | 4,359.73 | ..... |
| Grant G-19901 | 6,192.89 | 4,607.50 | 10,777.39 | 23.00 |
| Grant G-20220 | 14,299.30 | 32.49 | 14,331.79 | ..... |
| Grant G-20533 | 7,251.19 | 2,020.45 | 9,271.64 | ..... |
| Grant G-20673 | 98,521.28 | ..... | 98,521.28 | ..... |
| Grant G-21027 | 18,045.49 | 8,206.80 | 26,252.29 | ..... |
| Grant G-21262 | 230.72* | 17,416.06 | 17,185.34 | ..... |
| Grant G-21734 | 5,544.53 | 3,791.91 | 9,336.44 | ..... |
| Grant G-21848 | 7,791.13 | 30,964.17 | 38,755.30 | ..... |
| Grant G-21879 | 3,670.00 | ..... | 3,670.00 | ..... |
| Grant G-21955 | 1,992.50 | 17,093.86 | 19,086.36 | ..... |
| Grant G-22233 | 900.00 | ..... | 900.00 | ..... |
| Grant G-22386 | 7,600.00 | 14,985.89 | 22,585.89 | ..... |
| Grant G-22776 | ..... | 8,754.82 | 3,788.10 | 4,966.72 |
| Grant G-23399 | 2,049.75 | 579.56 | 2,629.31 | ..... |
| Grant G-23570 | 5,291.05 | 3,370.37 | 8,661.42 | ..... |
| Grant G-23652 | 3,100.00 | 6,512.28 | 9,612.28 | ..... |
| Grant G-23928 | ..... | 9,656.70 | 9,656.70 | ..... |
| Grant G-24388 | ..... | 27,673.76 | 29,117.52 | 1,443.76* |
| Grant G-24838 | ..... | 2,311.69 | 2,311.69 | ..... |
| Grant G-25128 | ..... | 14,885.63 | 14,885.63 | ..... |
| Grant GB-82 | ..... | 27,583.54 | 27,586.84 | 3.30* |
| Grant GB-98 | ..... | 9,597.41 | 9,597.41 | ..... |
| Grant GB-150 | ..... | 8,314.43 | 8,314.43 | ..... |
| Grant GB-158 | ..... | 30,528.48 | 30,528.48 | ..... |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant GB-349 | ..... | 5,188.02 | 5,188.02 | ..... |
| Grant GB-437 | ..... | 1,566.94 | 1,566.94 | ..... |
| Grant GB-471 | ..... | 749.24 | 749.24 | ..... |
| Grant GB-512 | ..... | 6,388.72 | 6,388.72 | ..... |
| Grant GB-727 | ..... | 692.16 | 692.16 | ..... |
| Grant GB-905 | ..... | 86.14 | 86.14 | ..... |
| Grant GB-1070 | ..... | 1,766.66 | 1,766.66 | ..... |
| Grant GB-1117 | ..... | 1,036.25 | 1,036.25 | ..... |
| Grant GE-100 | ..... | 805.31 | 770.31 | 35.00 |
| Grant GE-336 | ..... | 1,381.72 | 1,351.72 | 30.00 |
| Grant GE-611 | ..... | 41,928.64 | 41,928.64 | ..... |
| Grant GE-1033 | ..... | 2,605.75 | 2,605.75 | ..... |
| Grant GE-1861 | ..... | 533.62 | 533.62 | ..... |
| Grant GP-65 | ..... | 5,127.58 | 5,127.58 | ..... |
| Grant GP-407 | ..... | 9,175.29 | 9,175.29 | ..... |
| Grant GS-89 | ..... | 2,987.31 | 2,987.31 | ..... |
| Navy: | | | | |
| Contract NONR-1181 (03) | 304.80* | ..... | ..... | 304.80* |
| Contract NONR-1181 (04) | 28,186.33* | ..... | 2,008.08 | 30,194.41* |
| Contract NONR-1181 (05) | 3,721.91* | 15,058.06 | 17,525.36 | 6,189.21* |
| Contract NONR-1181 (06) | 1,324.31* | 3,644.28 | 5,126.40 | 2,806.43* |
| Contract NONR-1181 (07) | 1,773.32* | 3,428.96 | 2,625.45 | 969.81* |
| Contract NONR-1181 (10) | 2,729.93* | 14,089.16 | 14,588.02 | 3,228.79* |
| Contract NONR-1181 (11) | 720.61* | 9,661.96 | 10,338.54 | 1,927.19* |
| Contract NONR-1181 (12) | 2,148.18* | 17,747.92 | 21,730.78 | 6,131.04* |
| Contract NONR-1181 (13) | 2,673.39* | 11,169.54 | 12,562.24 | 4,066.09* |
| Contract NONR-1181 (14) | 1,888.89* | 12,785.09 | 16,698.67 | 5,802.47* |
| Contract NONR-1537 (00) | 2,679.05 | ..... | 6,649.54 | 3,970.49* |
| Contract NONR-2103 (00) | 3,191.38 | ..... | 6,407.31 | 3,215.93* |
| Contract NOP-1264 | 594.24* | 618.04 | 23.80 | ..... |
| Contract NOP-1465 | ..... | 1,672.49 | 2,072.55 | 400.06* |
| Contract NORD-16640 Subcontract No. 2 | 7,463.21* | 13,209.59 | 15,084.48 | 9,338.10* |
| North Carolina Board of Health Physical Therapy Contract | 6,291.21 | 12,269.88 | 15,171.01 | 3,390.08 |
| Small Business Administration: | | | | |
| Grant for Research in Legal and Economic-Legal Aspects of Small Business Planning | 364.16 | ..... | 2,076.50 | 1,712.34* |
| Grant for Research in Legal and Economic-Legal Aspects of Small Business Planning | 2,815.73* | 3,000.00 | 1,496.39 | 1,312.12* |
| U. S. Department of Agriculture: | | | | |
| Contract A8ls-20,148 Supplement No.11 | ..... | 1,193.80 | 1,193.80 | ..... |
| Contract A8ls-20,148 Supplement No.12 | 206.77 | ..... | ..... | 206.77 |
| U. S. Department of Interior Fish and Wildlife Service: | | | | |
| Contract 14-17-002-11 | 6,081.44* | 6,360.10 | 312.51 | 33.85* |
| Contract 14-17-0002-30 | ..... | 20,694.35 | 31,661.06 | 10,966.71* |
| Grant 14-17-0007-62 | ..... | 9,615.00 | 3,827.00 | 5,788.00 |
| Grant 14-17-0007-130 (G) | ..... | 6,140.00 | ..... | 6,140.00 |
| U. S. Office of Vocational Rehabilitation: | | | | |
| Grant 235-63 | ..... | 5,400.00 | 5,400.00 | ..... |
| Grant 431-T-63 | ..... | 15,600.00 | ..... | 15,600.00 |
| Grant No. RD-733-61-C1 | 804.65 | 77.67 | ..... | 882.32 |
| Grant No. RD-733-63-C2 | ..... | 16,000.00 | 5,520.74 | 10,479.26 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant No. RD-783 | 9,351.24 | ..... | 8,837.75 | 543.49 |
| Grant No. RD-783-63 (C1) | ..... | 32,389.14 | 27,431.00 | 4,958.14 |
| Grant No. 98-63 | ..... | 25,000.00 | 20,581.08 | 4,418.92 |
| Project 733-62 (C1) | 3,197.30 | 6,560.00 | 8,702.95 | 1,054.35 |
| Teaching Grant No. 98-62 | 4,367.45 | ..... | 4,444.20 | 76.75* |
| U. S. Public Health Service: | | | | |
| Contract OE-2-10-033 Project 1316B | ..... | 11,615.00 | 20,877.02 | 9,262.02* |
| Contract OE-3-13-070 | ..... | 3,000.00 | 375.40 | 2,624.60 |
| General Research Support Grant No. 1-GS-105 | 155,007.05 | 83,833.27 | 238,840.32 | ..... |
| General Research Support Grant No. Sol FR-05105-01 | ..... | 269,457.00 | 183,815.28 | 85,641.72 |
| Grant A836 (C4) | 647.35 | ..... | 647.35 | ..... |
| Grant A836 (C5) | 5,313.12 | 4,634.26 | 3,772.05 | 6,175.33 |
| Grant A1251 (C4) | 312.00 | ..... | 312.00 | ..... |
| Grant A1251 (C5) | 1,986.05 | 306.46 | 2,292.51 | ..... |
| Grant A1324 (C4) | 101.06* | 101.06 | ..... | ..... |
| Grant A1324 (C5) | 4,902.37 | ..... | 4,902.37 | ..... |
| Grant A1391 (C3) | ..... | 375.00 | 375.00 | ..... |
| Grant A1391 (C4) | 820.37 | ..... | 820.37 | ..... |
| Grant A1391 (C5) | 9,718.12 | 6,157.76 | 15,757.98 | 117.90 |
| Grant A1596 (C4) | 542.75 | ..... | 542.75 | ..... |
| Grant A1596 (C5) | 2,504.34 | 13,397.15 | 15,375.06 | 526.43 |
| Grant A1956 (C2) | 595.26* | 661.70 | 66.44 | ..... |
| Grant A1956 (C3) | 15,348.70 | ..... | 15,348.70 | ..... |
| Grant A1987 (C2) | 1.80 | ..... | 1.80 | ..... |
| Grant A1987 (C3) | 900.27 | ..... | 900.27 | ..... |
| Grant A2094 (C2) | 2,395.79 | ..... | 2,395.79 | ..... |
| Grant A2094 (C3) | 7,467.40 | 10,659.53 | 18,126.93 | ..... |
| Grant A2146 (C4) | 1,777.70 | ..... | 1,777.70 | ..... |
| Grant A2146 (C5) | 4,334.67 | 4,964.20 | 2,447.67 | 6,851.20 |
| Grant A2819 (C1) | 2,383.98 | ..... | 2,383.98 | ..... |
| Grant A2819 (C2) | 3,234.34* | 5,010.95 | 2,142.12 | 365.51* |
| Grant A2843 (C3) | 2,312.92 | ..... | 2,179.04 | 133.88 |
| Grant A2093 (C2) | 71.05 | ..... | 71.05 | ..... |
| Grant A2903 (C3) | 6,764.48 | 10,922.52 | 17,848.32 | 161.32* |
| Grant A3020 (C3) | 2,765.13 | ..... | 2,765.13 | ..... |
| Grant A3020 (C4) | 324.25 | 1,056.47 | 1,380.72 | ..... |
| Grant A3255 (C2) | 620.96 | ..... | 620.96 | ..... |
| Grant A3255 (C3) | 2,789.15* | 24,523.29 | 21,022.12 | 712.02 |
| Grant A3302 (C1) | 101.98 | ..... | 101.98 | ..... |
| Grant A3302 (C2) | 174.87* | 174.87 | ..... | ..... |
| Grant A4130 (C1) | 2,228.67 | ..... | 2,228.67 | ..... |
| Grant A4315 | 258.50* | 258.50 | ..... | ..... |
| Grant A4315 (C1) | 765.78 | ..... | 677.78 | 88.00 |
| Grant A4521 | 86.72* | 86.72 | ..... | ..... |
| Grant A4521 (C1) | 2,500.03 | 4,161.21 | 6,661.24 | ..... |
| Grant A4535 | 40.28 | ..... | 40.28 | ..... |
| Grant A4576 | 20,372.50 | ..... | 20,372.50 | ..... |
| Grant A4576 (C1) | 12,968.53 | ..... | 12,892.74 | 75.79 |
| Grant A4662 | 3,164.78 | ..... | 3,164.78 | ..... |
| Grant A4662 (C1) | 6,458.36 | 9,110.34 | 15,380.70 | 188.00 |
| Grant A4811 | 4,069.79 | ..... | 4,069.79 | ..... |
| Grant A4811 (C1) | 4,431.20 | 7,195.73 | 11,623.98 | 2.95 |
| Grant A4839 (C1) | 2,301.39 | ..... | 2,301.39 | ..... |
| Grant A4839 (C2) | 5,395.07* | 11,385.43 | 4,875.53 | 1,114.83 |
| Grant A5258 (C5) | 1,282.45 | 931.21 | 6,218.66 | 4,005.00* |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant A5427 | 8,149.56 | 14,324.00 | 17,672.16 | 4,801.40 |
| Grant A5500 | 7,722.97 | ..... | 7,722.97 | ..... |
| Grant A5509 | 7,883.59 | ..... | 7,883.59 | ..... |
| Grant A5559 | 2,779.69* | 7,130.05 | 4,350.36 | ..... |
| Grant A5812 | 831.54 | 9,583.76 | 11,075.51 | 660.21* |
| Grant A5930 | 880.63 | 11,476.00 | 13,624.68 | 1,268.05* |
| Grant A6118 | 5,377.00 | 12,082.00 | 16,618.23 | 840.77 |
| Grant 2A5012 (C5) | 11,679.04* | 12,085.59 | 406.55 | ..... |
| Grant 2A5012 (C6) | ..... | 53,836.41 | 43,773.26 | 10,063.15 |
| Grant 2A5074 (C5) | 3,553.81* | 4,275.70 | 721.89 | ..... |
| Grant 2A5074 (C6) (C6S) | 18,989.00 | 61,967.00 | 67,379.84 | 13,576.16 |
| Grant 2A5093 (C4) | 3,255.48 | ..... | 3,255.48 | ..... |
| Grant 2A5093 (C5) | 15,000.00 | 48,093.65 | 58,342.14 | 4,751.51 |
| Grant 2A5335 | 7,993.00 | 23,979.00 | 22,315.50 | 9,656.50 |
| Grant AH4828 | 24,862.40 | ..... | 24,847.41 | 14.99 |
| Grant AI 01659-06 | ..... | 5,883.49 | 8,613.71 | 2,730.22* |
| Grant AI 01866-06 | ..... | 6,628.56 | 5,107.58 | 1,520.98 |
| Grant AI 01991-05 | ..... | 5,332.00 | 2,744.55 | 2,587.45 |
| Grant AI 02035-05 | ..... | 12,686.12 | 8,847.96 | 3,838.16 |
| Grant AI 03988-02 | 2,247.92 | 10,114.18 | 3,526.80 | 8,835.30 |
| Grant AI 03988-03 | ..... | 2,310.00 | 51.30 | 2,258.70 |
| Grant AI 04827-01 | ..... | 8,080.66 | 7,282.68 | 797.98 |
| Grant AI-K3-9858 (C1) | ..... | 14,617.00 | 14,828.37 | 211.37* |
| Grant AI-K3-14,797 (C1) | ..... | 12,576.00 | 12,637.45 | 61.45* |
| Grant AI-K6-18,399 | ..... | 21,122.00 | 17,700.40 | 3,421.60 |
| Grant AM 01251-07-GM | ..... | 16,505.22 | 9,705.72 | 6,799.50 |
| Grant AM 01324-07 | ..... | 25,967.64 | 23,380.52 | 2,587.12 |
| Grant AM 01391-07 | ..... | 17,492.61 | 15,428.67 | 2,063.94 |
| Grant AM 01596-07 | ..... | 3,060.00 | 2,483.93 | 576.07 |
| Grant AM 01956-05 | ..... | 26,065.00 | 22,429.77 | 3,635.23 |
| Grant AM 01987-05 | ..... | 11,445.97 | 11,205.04 | 240.93 |
| Grant AM 02094-05 | ..... | 12,479.99 | 4,582.50 | 7,897.49 |
| Grant AM 02146-07 | ..... | 3,739.00 | 2,755.16 | 983.84 |
| Grant AM 02819-04 | ..... | 5,427.00 | 8,256.94 | 2,829.94* |
| Grant AM 02903-05 | ..... | 13,644.64 | 19,462.18 | 5,817.54* |
| Grant AM 03255-05 | ..... | 4,712.00 | 2,401.63 | 2,310.37 |
| Grant AM 04130-03 | 2,930.07 | 17,041.44 | 20,197.24 | 225.73* |
| Grant AM 04130-04 | ..... | 5,088.00 | 359.41 | 4,728.59 |
| Grant AM 04315-03 PC | ..... | 16,678.74 | 14,309.18 | 2,369.56 |
| Grant AM 04521-03 | ..... | 4,464.85 | 5,667.60 | 1,202.75* |
| Grant AM 04576-03 | ..... | 56,376.97 | 31,759.52 | 24,617.45 |
| Grant AM 04662-03 | ..... | 15,460.75 | 7,031.06 | 8,429.69 |
| Grant AM 04839-04 | ..... | 34,630.00 | 28,878.02 | 5,751.98 |
| Grant AM 05258-07 | ..... | 3,073.79 | 3,868.74 | 794.95* |
| Grant AM 05427-02 | ..... | 21,204.00 | 10,708.08 | 10,495.92 |
| Grant AM 05500-02 | ..... | 14,805.49 | 13,485.40 | 1,320.09 |
| Grant AM 05509-02 | ..... | 19,155.03 | 22,787.47 | 3,632.44* |
| Grant AM 05559-02 | ..... | 11,642.95 | 19,547.90 | 7,904.95* |
| Grant AM 05812-02 | ..... | 15,988.24 | 15,147.64 | 840.60 |
| Grant AM 05930-02 | ..... | 10,958.00 | 8,952.72 | 2,005.28 |
| Grant AM 06118-02 | ..... | 10,837.00 | 2,973.10 | 7,863.90 |
| Grant AM 06306-01 | ..... | 23,318.00 | 27,034.34 | 3,716.34* |
| Grant AM 06677-01 | ..... | 17,329.00 | 5,279.14 | 12,049.86 |
| Grant AM 06815-01 | ..... | 21,665.00 | 6,709.92 | 14,955.08 |
| Grant AM 06851-01 | ..... | 4,218.00 | 7,323.50 | 3,105.50* |
| Grant AM 07044-01 | ..... | 3,684.00 | ..... | 3,684.00 |
| Grant AM 07048-01 | ..... | 17,987.56 | 30,342.85 | 12,355.29* |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant AM 07420-01 | ..... | ..... | 352.88 | 352.88* |
| Grant AM 07485-01 | ..... | 2,500.00 | 3,215.86 | 715.86* |
| Grant AM 07562-01 | ..... | 3,783.00 | 186.00 | 3,597.00 |
| Grant AM-K-16,693 | ..... | 14,401.00 | 13,860.39 | 540.61 |
| Grant AM-K6-18433 | 3,653.00 | 10,953.00 | 14,668.13 | 62.13* |
| Grant 1-F2-AM-19,006-01 | ..... | 500.00 | 397.26 | 102.74 |
| Grant 5K6-AM-18,433-02 | ..... | 3,807.00 | ..... | 3,807.00 |
| Grant T1-AM-5074-08 & 0881 | ..... | 28,034.00 | ..... | 28,034.00 |
| Grant T1-AM-5093-07 & 0781 | ..... | 14,141.00 | ..... | 14,141.00 |
| Grant T1-AM-5335-02 | ..... | 7,993.00 | 6.00 | 7,987.00 |
| Grant APD-18,902 | ..... | 500.00 | 499.63 | .37 |
| Grant ASP-13,227-C1 | ..... | 500.00 | 501.37 | 1.37* |
| Grant ASP-13,251-C1 | ..... | 500.00 | 501.96 | 1.96* |
| Grant B669 (C7) | 77.25* | 187.61 | 110.36 | ..... |
| Grant B906 (C14) | 34.52* | 34.52 | ..... | ..... |
| Grant B1161 (C4) | 4,202.85 | ..... | 4,202.85 | ..... |
| Grant B1161 (C5) | 3,013.24 | 9,178.85 | 11,441.22 | 750.87 |
| Grant B2324 (C1) | 206.47 | ..... | 206.47 | ..... |
| Grant B2324 (C2) | 3,983.49 | 38.30 | 4,021.79 | ..... |
| Grant B2365 (C4) | 4,911.61 | ..... | 4,911.61 | ..... |
| Grant B2369 (C4) | 220.95 | ..... | 220.95 | ..... |
| Grant B2369 (C5) | 191.24 | 5,942.00 | 6,133.24 | ..... |
| Grant B2434 (C1) | 328.16* | 376.59 | 48.43 | ..... |
| Grant B2434 (C2) | 2,088.52 | 4,549.67 | 6,443.32 | 194.87 |
| Grant B2793 (C1) | 4,390.45 | 8,915.24 | 13,305.69 | ..... |
| Grant B2793 (R1) | 166.34 | ..... | 166.34 | ..... |
| Grant B2839 (C1) | 12,165.26 | ..... | 5,003.08 | 7,162.18 |
| Grant B3261 | 2,003.51 | ..... | 2,003.51 | ..... |
| Grant B3437 | 9,953.33 | ..... | 9,953.33 | ..... |
| Grant B3502 | 6,406.60 | ..... | 6,406.60 | ..... |
| Grant B3670 | 24,356.67 | ..... | 15,192.24 | 9,164.43 |
| Grant B3670 (C1) | 8,321.49 | 50,850.00 | 68,776.88 | 9,605.39* |
| Grant B3799 | 2,346.87 | ..... | 2,346.87 | ..... |
| Grant B3873 | 7,143.12 | 26,841.00 | 7,645.76 | 26,338.36 |
| Grant B3897 | 4,133.73 | 12,504.00 | 12,157.84 | 4,479.89 |
| Grant 2B5019 (C4) | 746.54 | 165.36 | 911.90 | ..... |
| Grant 2B-5189 (C2) | ..... | 3,347.36 | 3,347.36 | ..... |
| Grant 2B5189 (C3) (R1) | 538.95 | ..... | 538.95 | ..... |
| Grant 2B5212 (C2) (S1) | 10,391.95 | ..... | 10,391.95 | ..... |
| Grant 2B5212 (C3) | ..... | 48,284.03 | 31,403.87 | 16,880.16 |
| Grant 2B5232 (C2) | 1,296.93* | 2,019.31 | 722.38 | ..... |
| Grant 2B-5232 (C3) | ..... | 26,958.00 | 43,038.65 | 16,080.65* |
| Grant 2B5358 | 4,984.80 | ..... | 4,984.80 | ..... |
| Grant 2B-5358 (C1) | ..... | 26,604.17 | 17,781.09 | 8,823.08 |
| Grant C2602 (C3) | 2,052.22 | ..... | 2,052.22 | ..... |
| Grant C2602 (C4) | 3,403.13 | 7,764.90 | 5,740.58 | 5,427.45 |
| Grant C2659 (C6) | 27,671.02 | ..... | 27,671.02 | ..... |
| Grant C3894 (C2) | 3,843.79 | ..... | 3,843.79 | ..... |
| Grant C4572 (C2) | 7,424.46 | ..... | 7,424.46 | ..... |
| Grant C4572 (C3) | 10,616.83 | 140,489.02 | 151,085.56 | 20.29 |
| Grant C6452 | 3,698.77 | 15,071.28 | 18,770.05 | ..... |
| Grant CA 02602-06 | ..... | 7,446.00 | 8,363.15 | 917.15* |
| Grant CA 02659-08 | 4,162.78* | 24,593.21 | 14,227.67 | 6,202.76 |
| Grant CA 02.59-09 | ..... | 6,979.25 | 1,226.23 | 5,753.02 |
| Grant CA 03177-07 | ..... | 16,244.00 | 18,403.93 | 2,159.93* |
| Grant CA 03252-06 | ..... | 13,477.23 | 6,654.17 | 6,823.06 |
| Grant CA 04142-05 | 3,318.19 | 14,436.86 | 17,838.03 | 82.98* |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant CA 04298-05 | ..... | 11,787.96 | 4,413.21 | 7,374.75 |
| Grant CA 04455-04 | 1,992.58 | 17,615.89 | 15,542.21 | 4,066.26 |
| Grant CA 04455-05 | ..... | 4,687.00 | 2,088.39 | 2,598.61 |
| Grant CA 04572-05 | ..... | 55,873.10 | 40,963.20 | 14,909.90 |
| Grant CA 04605-04 | ..... | 9,597.83 | 8,363.54 | 1,234.29 |
| Grant CA 04751-04 | 3,445.98 | 12,281.77 | 14,587.08 | 1,140.67 |
| Grant CA 04751-05 | ..... | ..... | 725.33 | 725.33* |
| Grant CA 04830-04 | ..... | 4,710.00 | 4,357.67 | 352.33 |
| Grant CA 05507-02 | 381.27 | 13,577.00 | 7,509.64 | 6,448.63 |
| Grant CA 05507-03 | ..... | 3,184.00 | 1,804.44 | 1,379.56 |
| Grant CA 05509-03 | ..... | 12,588.04 | 8,865.95 | 3,722.09 |
| Grant CA 05634-03 | ..... | 13,501.22 | 12,549.56 | 951.66 |
| Grant CA 06452-02S1 | ..... | 12,602.72 | 5,981.14 | 6,621.58 |
| Grant CA 06580-01 | ..... | 34,009.00 | 11,436.32 | 22,572.68 |
| Grant CA 06691-01 | ..... | 31,100.00 | ..... | 31,100.00 |
| Grant CA 06786-01 | ..... | 8,983.00 | 2,505.33 | 6,477.67 |
| Grant CA 06911-01 | ..... | 59,013.00 | 33,882.88 | 25,130.12 |
| Grant CA 07136-01 | ..... | 2,116.00 | 47.92 | 2,068.08 |
| Grant CA 07371-01 | ..... | ..... | 19.15 | 19.15* |
| Grant 5T4 CA 5042-05 | ..... | 13,877.00 | 4,412.24 | 9,464.76 |
| Grant 5T1 CA 5048-05 | ..... | ..... | 302.70 | 302.70* |
| Grant 5T1 CA 5143-02 | ..... | 7,552.00 | 1,044.44 | 6,507.56 |
| Grant CF 8728 (C3) | 12.28* | 12.28 | ..... | ..... |
| Grant CF 17145 | 163.90 | ..... | 163.90 | ..... |
| Grant CLT 7028 (C1) | 31.08 | 8.44 | 39.52 | ..... |
| Grant CLT 7029 (C1) | 2,334.00 | ..... | 2,334.00 | ..... |
| Grant CPD-15,387 | ..... | 500.00 | 565.74 | 65.74* |
| Grant CRT 5048 (C2) | 11,781.37 | ..... | 11,781.37 | ..... |
| Grant CRT 5048(C3) | 2,853.34 | 23,382.37 | 1,701.31 | 24,534.40 |
| Grant CRT 5143 | ..... | 29,495.00 | 19,296.04 | 10,198.96 |
| Grant CRTY 5042 (C2) | 34,141.24 | ..... | 34,141.24 | ..... |
| Grant CRTY 5042 (C3) | 6,505.57* | 71,057.40 | 56,220.18 | 8,331.65 |
| Grant CS 9736 | 3,721.63* | 3,721.63 | ..... | ..... |
| Grant CSP 8520 (C2) | ..... | 500.00 | 512.81 | 12.81* |
| Grant CT 542 (C12) | 3,782.78 | ..... | 3,782.78 | ..... |
| Grant CT 542 (C13) | 5,031.39 | ..... | 5,031.39 | ..... |
| Grant CT 542 (C14) | ..... | 29,370.91 | 18,150.38 | 11,220.53 |
| Grant CY 3252 (C3) | 1,268.14 | ..... | 1,268.14 | ..... |
| Grant CY 3252 (C4) | 4,441.70 | ..... | 4,441.70 | ..... |
| Grant CY 4142 (C3) | 4,618.28 | ..... | 4,618.28 | ..... |
| Grant CY 4298 (C2) | 3,972.68 | ..... | 3,972.68 | ..... |
| Grant CY 4298 (C3) | 2,056.81 | 6,344.72 | 8,401.53 | ..... |
| Grant CY 4455 (C2) | 5,904.33 | ..... | 5,059.22 | 845.11 |
| Grant CY 4605 (C1) | 1,443.97 | ..... | 1,443.97 | ..... |
| Grant CY 4605 (C2) | 1,940.82* | 4,694.31 | 2,753.49 | ..... |
| Grant CY 4751 (C2) | 1,305.73* | 1,305.73 | ..... | ..... |
| Grant CY 4860 (C1) | 5,412.57* | 5,488.48 | 75.91 | ..... |
| Grant CY 4860 (C2) | 6,925.05* | 13,536.00 | 6,014.22 | 596.73 |
| Grant CY 5507 | 5,124.70 | ..... | 5,124.70 | ..... |
| Grant CY 5509 | 4,697.84 | ..... | 4,697.84 | ..... |
| Grant CY 5509 (C1) | 3,402.39* | 13,523.80 | 10,121.41 | ..... |
| Grant CYP 3177 (C4) | 13,754.64* | 13,754.64 | ..... | ..... |
| Grant CYP 3177 (C5) | 2,443.64* | 21,145.71 | 18,702.07 | ..... |
| Grant CYP 4053 (C3) | 144.34* | 144.34 | ..... | ..... |
| Grant CYP 5634 | 3,422.26 | ..... | 3,422.26 | ..... |
| Grant CYP 5634 (C1) | 2,427.02 | 12,075.04 | 14,502.06 | ..... |
| Grant D870 (C2) | 4,457.31 | ..... | 4,457.31 | ..... |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant D870 (C3) | 70.57* | 7,992.00 | 8,921.94 | 1,000.51* |
| Grant D900 (C2) | 266.47* | 316.86 | 50.39 | ..... |
| Grant D1382 | 5,233.45 | ..... | 5,233.45 | ..... |
| Grant D1382 (C1) | 193.67* | 13,586.69 | 12,912.09 | 480.93 |
| Grant DE 01382-03S1 | ..... | 13,132.00 | 12,131.20 | 1,000.80 |
| Grant DE 01750-01 | ..... | 11,500.00 | 9,022.18 | 2,477.82 |
| Grant DT-92 | ..... | 36,781.00 | 18,869.76 | 17,911.24 |
| Grant E 695 (C6) | 782.80 | ..... | 782.80 | ..... |
| Grant E 700 (C6) (S2) | 693.66 | ..... | 693.66 | ..... |
| Grant E 861 (C6) | 2,328.74 | ..... | 2,328.74 | ..... |
| Grant E 1659 (C3) (S1) | 94.74* | 94.74 | ..... | ..... |
| Grant E 1659 (C4) | 1,160.42 | 2,741.51 | 3,901.93 | ..... |
| Grant E 1836 (C3) | 1,739.83 | ..... | 1,739.83 | ..... |
| Grant E 1866 (C4) | 643.03 | 2,848.22 | 3,491.25 | ..... |
| Grant E 1991 (C2) (S2) | 6,947.20 | ..... | 6,947.20 | ..... |
| Grant E 1991 (C3) | 8,164.64 | 4,688.30 | 699.89 | 12,153.05 |
| Grant E 1999 (C2) | 274.37* | 274.37 | ..... | ..... |
| Grant E 2513 (C2) | 7,553.19 | ..... | 7,553.19 | ..... |
| Grant E 2035 (C3) | 1,956.99 | 5,230.44 | 7,187.43 | ..... |
| Grant E 2035 (C2) | 4,552.88 | ..... | 4,552.88 | ..... |
| Grant E 3624 | 11.59 | ..... | 11.59 | ..... |
| Grant E 3988 | 3,456.66 | ..... | 3,456.66 | ..... |
| Grant 2E 23 (C1) | 1,364.19* | 1,364.19 | ..... | ..... |
| Grant 2E 23 (C2) | 6,205.50 | ..... | 6,205.50 | ..... |
| Grant 2E 31 (C3) | 474.56 | ..... | 474.56 | ..... |
| Grant 2E-31 (C4) | ..... | 30,319.21 | 27,011.28 | 3,307.93 |
| Grant EF 14680 | 141.03 | ..... | 141.03 | ..... |
| Grant EPD-14,680-C1 | ..... | 500.00 | 477.98 | 22.02 |
| Grant ESG 9858 | 78.10* | 78.10 | ..... | ..... |
| Grant ESG 14797 | 53.89* | 53.89 | ..... | ..... |
| Grant ESP 17745 | 1.94 | ..... | 1.94 | ..... |
| Grant F 700 (C7) | 1,844.21 | 2,720.11 | 4,641.53 | 77.21* |
| Grant FF-416 | ..... | 8,691.00 | 7,061.47 | 1,629.53 |
| Grant FF-442 | ..... | 6,675.00 | 4,565.18 | 2,109.82 |
| Grant FF-547 | ..... | ..... | 2,489.20 | 2,489.20* |
| Grant FFG 266 | 346.26 | ..... | 346.26 | ..... |
| Grant FR-30-02 | 4,299.41 | 470,952.89 | 255,355.30 | 219,897.00 |
| Grant 2G 233 (C1) | 7,683.93 | ..... | 7,683.93 | ..... |
| Grant 2G-233 (C2) | ..... | 124,951.04 | 110,560.50 | 14,390.54 |
| Grant 2G 516 (C1) | 5,480.53 | ..... | 5,480.53 | ..... |
| Grant 2G 516 (C2) | 8.24* | 65,168.00 | 57,756.89 | 7,402.87 |
| Grant 2G 726 | 1,068.31* | 1,068.31 | ..... | ..... |
| Grant 2G-726 (C1) | ..... | 11,696.00 | 19,051.78 | 7,355.78* |
| Grant 2G-929 | ..... | 40,000.00 | 39,188.37 | 811.63 |
| Grant 2G-1019 | ..... | 65,000.00 | 47,954.02 | 17,045.98 |
| Grant CF-17,672-02 | ..... | 500.00 | 500.00 | ..... |
| Grant GM-0009-17 | 1,249.38* | 70,022.00 | 68,526.93 | 245.69 |
| Grant GM-00091-18 | ..... | ..... | 3,712.84 | 3,712.84* |
| Grant GM 04758-07 | ..... | 31,730.41 | 17,056.21 | 14,674.20 |
| Grant GM 05385-06A1 | ..... | 177,824.87 | 179,767.24 | 1,942.37* |
| Grant GM 06242-04 | 1,090.40* | 44,675.00 | 44,960.00 | 1,375.40* |
| Grant GM 06242-05 | ..... | 13,182.00 | 11,774.32 | 1,407.68 |
| Grant GM 06628-04 | ..... | 12,233.00 | 20,086.60 | 7,853.60* |
| Grant GM 06753-04 | ..... | 18,504.99 | 16,766.39 | 1,738.60 |
| Grant GM 06912-03 | 4,598.73 | 7,753.48 | 24,664.20 | 12,311.99* |
| Grant GM 06912-04 | ..... | 10,122.00 | 1,765.77 | 8,356.23 |
| Grant GM 06975-03 | ..... | 7,948.26 | 3,945.93 | 4,002.33 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant GM 07250-03 | ..... | 14,901.00 | 13,839.86 | 1,061.14 |
| Grant GM 07290-03 | 6,204.67* | 21,174.04 | 9,178.47 | 5,790.90 |
| Grant GM 07290-04 | ..... | 3,464.11 | 445.81 | 3,018.30 |
| Grant GM 07653-03 | ..... | 13,641.21 | 17,612.64 | 3,971.43* |
| Grant GM 08345-02 | 2,719.00 | 10,278.73 | 11,836.48 | 1,161.25 |
| Grant GM 08345-03 | ..... | 3,366.55 | 5,944.08 | 2,577.53* |
| Grant GM 08702-02 | ..... | 6,643.00 | 27,363.23 | 20,720.23* |
| Grant GM 08803-02 | ..... | 16,517.18 | 13,732.75 | 2,784.43 |
| Grant GM 09389-02 | ..... | 11,747.91 | 7,916.36 | 3,831.55 |
| Grant GM 09730-02 | ..... | 4,248.00 | 1,746.07 | 2,501.93 |
| Grant GM 09767-02 | ..... | ..... | 806.42 | 806.42* |
| Grant GM 10287-01 | ..... | 42,666.00 | 29,537.99 | 13,128.01 |
| Grant GM 10317-01 | ..... | 24,041.00 | 12,488.59 | 11,552.41 |
| Grant GM 10356-01 | 566.55* | 173,651.60 | 109,775.87 | 63,309.18 |
| Grant GM 10965-03 | ..... | 10,500.00 | 8,890.73 | 1,609.27 |
| Grant GM-17,672-02 | ..... | 4,700.00 | 3,117.34 | 1,582.66 |
| Grant GM-K3-1366-C2 | ..... | 18,906.34 | 17,281.96 | 1,624.38 |
| Grant GM-K3-15184 (C3) | 95.63* | 8,616.00 | 8,740.33 | 219.96* |
| Grant GM-K3-15184 (C3) (B) | 5,717.00 | ..... | 5,492.73 | 224.27 |
| Grant GM-K3-3089-C5-A | ..... | 14,573.00 | 13,443.15 | 1,129.85 |
| Grant GM-K3-3089-C5-B | ..... | 3,105.00 | 1,309.85 | 1,795.15 |
| Grant GM-K3-4385-C2-A | ..... | 24,288.00 | 20,245.36 | 4,042.64 |
| Grant GM-K3-4385-C2-B | ..... | 4,370.00 | 3,280.44 | 1,089.56 |
| Grant GM-K3-4416 (C3A) | 5.95 | 5,770.00 | 5,751.53 | 24.42 |
| Grant GM-K6-14,222 | ..... | 21,507.00 | 21,421.50 | 85.50 |
| Grant 1-F2-GM-17,392-01A1 | ..... | ..... | 500.00 | 500.00* |
| Grant 5-K3-GM-4416-05 | ..... | 7,483.00 | 7,479.06 | 3.94 |
| Grant 5-K3-GM-15,184-05 | ..... | 3,738.00 | 3,763.51 | 25.51* |
| Grant 1 T1 GM-946-01 | ..... | 9,072.00 | 2,198.44 | 6,873.56 |
| Grant GN-5880 (C2) | 10,257.83 | ..... | 3,070.11 | 7,187.72 |
| Grant GN-6912 (C1) | 2,106.71 | ..... | 2,106.71 | ..... |
| Grant GPD-14,316-C1 | ..... | 500.00 | 499.93 | .07 |
| Grant GPD-16,117 | ..... | 500.00 | 207.04 | 292.96 |
| Grant GPM-16,483 | ..... | 3,967.00 | 1,680.16 | 2,286.84 |
| Grant GPM-19,189 | ..... | 5,000.00 | 2,052.13 | 2,947.87 |
| Grant GSF-64 (C4) | 2,064.20 | ..... | 2,064.20 | ..... |
| Grant GSF-454 (C1) | 7,018.81 | ..... | 7,018.81 | ..... |
| Grant GSF-455 (C1) | 2,460.41 | ..... | 2,460.41 | ..... |
| Grant GSF-4416 (C2) | 1,667.14 | ..... | 1,667.14 | ..... |
| Grant GSF-14222 | 4,105.12 | ..... | 4,105.12 | ..... |
| Grant GSF-15184 (C2) | 1,910.09 | ..... | 1,910.09 | ..... |
| Grant H 763 (C9) | 3,903.33 | ..... | 3,903.33 | ..... |
| Grant H 763 (C10) | 560.28 | 51,795.73 | 52,356.01 | ..... |
| Grant H 1226 (C9) | 4,343.20 | ..... | 4,343.20 | ..... |
| Grant H 1226 (C10) | 14,012.05 | ..... | 14,012.05 | ..... |
| Grant H 1782 (C7) | 8,991.61 | ..... | 8,991.61 | ..... |
| Grant H 2170 (C6) | 8,875.08 | ..... | 8,875.08 | ..... |
| Grant H 22-8 (C5) | 1,088.93* | 1,088.93 | ..... | ..... |
| Grant H 2228 (C6) | 7,431.38 | 3,016.76 | 10,448.14 | ..... |
| Grant H 2616 (C4) | 1,362.51 | ..... | 1,362.51 | ..... |
| Grant H 2616 (C5) | 6,399.45 | 4,980.48 | 11,379.93 | ..... |
| Grant H 2624 (C5) | 4,432.19 | ..... | 4,432.19 | ..... |
| Grant H 2759 (C4) | 1,987.81* | 1,987.81 | ..... | ..... |
| Grant H 2759 (C5) | 1,777.70 | 3,218.95 | 4,996.65 | ..... |
| Grant H 2788 (C4) | 6,543.06* | 10,849.68 | 4,286.63 | 20.29 |
| Grant H 30-8 (C3) | 4,257.50 | ..... | 4,257.50 | ..... |
| Grant H 3028 (C4) | 4,522.09 | ..... | 4,522.09 | ..... |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| Name of Fund | Balance July 1, 1962 | Received | Disbursed | Balance June 30, 1963 |
|---|---|---|---|---|
| Grant H 3096 (C2) | 126.45* | 126.45 | ..... | ..... |
| Grant H 3371 (C3) | 1,987.26 | ..... | 1,987.26 | ..... |
| Grant H 3371 (C4) | 123.82 | 1,249.50 | 1,373.32 | ..... |
| Grant H 3476 (C3) | 681.19* | 681.19 | ..... | ..... |
| Grant H 3476 (C4) | 1,881.91 | 7,830.00 | 8,863 01 | 848.90 |
| Grant H 3549 (C3) | 206.43* | 206.43 | ..... | ..... |
| Grant H 3549 (C4) | 62,673.62 | 3,854.00 | 7,306.55 | 59,221.07 |
| Grant H 3582 (C3) | 2,388.65 | ..... | 2,388.65 | ..... |
| Grant H 3582 (C4) | 81,855.52 | 89,829.54 | 171,685.06 | ..... |
| Grant H 3997 | 3,813.14 | ..... | 3,813.14 | ..... |
| Grant H 3997 (C1) | 1,884.20 | 4,257.92 | 6,142.12 | ..... |
| Grant H 4206 (C2) | 4,815.56 | ..... | 4,683.56 | 132.00 |
| Grant H 4416 (C2) | 6,240.26 | ..... | 2,540.49 | 3,699.77 |
| Grant H 4678 (C1) | 668.94 | ..... | 668.94 | ..... |
| Grant H 4678 (C2) | 1,822.46 | 770.13 | 2,592.59 | ..... |
| Grant H 4702 (C1) | 1,375.30* | 1,375.30 | ..... | ..... |
| Grant H 4702 (C2) | 13,873.12 | ..... | 13,873.12 | ..... |
| Grant H 4837 | 2,801.27 | ..... | 2,801.27 | ..... |
| Grant H 4837 (C1) | 6,985.70 | 1,689.92 | 8,675.62 | ..... |
| Grant H 5019 (C1) | 1,463.07 | ..... | 1,463.07 | ..... |
| Grant H 5019 (C2) | 547.17* | 5,397.07 | 4,793.63 | 56.27 |
| Grant H 5640 | 1,006.81 | ..... | 1,006.81 | ..... |
| Grant H 5640 (C1) | 9,028.90 | ..... | 8,652.14 | 376.76 |
| Grant H 5834 | 364.94 | ..... | 364.94 | ..... |
| Grant H 5834 (C1) | 846.68 | 364.94 | 61.82 | 1,149 80 |
| Grant H 5875 | 7,930.72 | ..... | 7,930.72 | ..... |
| Grant H 5875 (C1) | 6,123.92* | 15,546.53 | 9,422.61 | ..... |
| Grant H 5900 | 3,819.83 | ..... | 3,819.83 | ..... |
| Grant H 5968 (C1) | 22,494.08 | ..... | 22,494.08 | ..... |
| Grant H 5969 | 847.04* | 847.04 | ..... | ..... |
| Grant H 6146 | 1,611.31 | ..... | 1,611.31 | ..... |
| Grant H 6299 | 15,105.08 | ..... | 15,105.08 | ..... |
| Grant H 5317 | 30.000.00 | ..... | 30,000.00 | ..... |
| Grant H 6381 | 5,854.56 | ..... | 5,854.56 | ..... |
| Grant H 6400 | 20,462.36 | ..... | 20,462.36 | ..... |
| Grant H 6947 | 3,572.06 | ..... | 3,572.06 | ..... |
| Grant H 6947 (C1) | 322.13* | 7,052.90 | 6,735.77 | 5.00* |
| Grant H 6960 | 36,967.38 | 111,387.00 | 32,008.83 | 116,345.55 |
| Grant H 7061 | 8,429.36 | 28,266.00 | 35,657.03 | 1,038.33 |
| Grant 5-F2-H-14,611-02 | ..... | 500.00 | 500.00 | ..... |
| Grant HE 00763-12 | ..... | 8,486.60 | 2,330.00 | 6,156.60 |
| Grant HE 01226-12 | ..... | 14,011.64 | 20,610.03 | 6,598.39* |
| Grant HE 01782-09 | ..... | 17,732.39 | 34,281.26 | 16,548.87* |
| Grant HE 02170-08 | ..... | 19,345.13 | 13,225.10 | 6,120.03 |
| Grant HE 02228-08 | ..... | 15,076.09 | 13,478.86 | 1,597.23 |
| Grant HE 02624-07 | ..... | 23,605.89 | 20,200.01 | 3,405.88 |
| Grant HE 02759-07 | ..... | 7,577.92 | 3,824.83 | 3,753.09 |
| Grant HE 03028-06 | ..... | 19,532.41 | 11,358.92 | 8,173.49 |
| Grant HE 03371-06 | ..... | 12,435.39 | 10,425.37 | 2,070.02 |
| Grant HE 03549-06 | ..... | 7,708.00 | 9,233.65 | 1,525.65* |
| Grant HE 03997-03 | ..... | 7,055.22 | 9,720.97 | 2,665.75* |
| Grant HE 04416-04 | ..... | 6,060.00 | 620.08 | 5,439.92 |
| Grant HE 04702-04 | ..... | 26,761.28 | 14,562.63 | 12,198.65 |
| Grant HE 04807-03 | ..... | 57,442.25 | 44,114.65 | 13,327.60 |
| Grant HE 05640-03 | ..... | 15,196.24 | 10,047.70 | 5,148.54 |
| Grant HE 05875-03 | ..... | 17,963.62 | 9,338.19 | 8,625.43 |
| Grant HE 05900-02 | 149.58 | 13,027.73 | 12,263.16 | 914.15 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant HE 05900-03 | ..... | 3,130.00 | ..... | 3,130.00 |
| Grant HE 06146-02 | 708.95 | 7,172.96 | 7,179.56 | 702.35 |
| Grant HE 06146-03 | ..... | 4,211.00 | 829.10 | 3,381.90 |
| Grant HE 06381-02 | ..... | 10,937.84 | 18,121.88 | 7,184.04* |
| Grant HE 06400-02 | ..... | 33,935.67 | 25,108.93 | 8,826.74 |
| Grant HE-06947-03 | ..... | 8,301.46 | 2,746.31 | 5,555.15 |
| Grant HE 07061-02 | ..... | 5,133.00 | 1,609.48 | 3,523.52 |
| Grant HE 07369-02 | ..... | 12,620.00 | 15,838.79 | 3,218.79* |
| Grant HE 07563-01 | ..... | 172,174.00 | 139,790.96 | 32,383.04 |
| Grant HE 07780-01 | ..... | 12,981.00 | 1,310.68 | 11,670.32 |
| Grant HE 07893-01 | ..... | 15,144.00 | 516.57 | 14,627.43 |
| Grant HE 07868-01 | ..... | 19,965.00 | 2,514.39 | 17,450.61 |
| Grant HE 07896-01 | ..... | 196,979.00 | 18,944.80 | 178,034.20 |
| Grant HE 08487-01 | ..... | ..... | 1,502.96 | 1,502.96* |
| Grant HE-K3-17,923 | ..... | 14,615.00 | 14,247.47 | 367.53 |
| Grant HE-K6-14,188-R1 | ..... | 28,256.00 | 28,006.24 | 249.76 |
| Grant 5-F2-HE-17,915-02 | ..... | 500.00 | 323.20 | 176.80 |
| Grant 7-F2-HE-17,640-02 | ..... | 250.00 | 45.65 | 204.35 |
| Grant 5T1-HE-5119-04 | ..... | 128.08 | ..... | 128.08 |
| Grant 5T1 HE 5372-05 | ..... | 46.73 | ..... | 46.73 |
| Grant HF 7297 (C3) | 134.87 | ..... | 134.87 | ..... |
| Grant HF 14661 | 134.99* | 134.99 | ..... | ..... |
| Grant HF 14743 | 195.28 | ..... | 195.28 | ..... |
| Grant HP 7369 | 62.81* | 12,726.00 | 4,221.39 | 8,441.80 |
| Grant HPD-14,743-C1 | ..... | 500.00 | 216.92 | 283.08 |
| Grant HPD-15,803 | ..... | 500.00 | 141.61 | 358.39 |
| Grant HPD-17669 | 500.00 | ..... | 495.49 | 4.51 |
| Grant HPD-17915 | 10.73* | 10.73 | ..... | ..... |
| Grant HPD-18,621 | ..... | 500.00 | 500.00 | ..... |
| Grant HSF-934-C1 | ..... | 500.00 | ..... | 500.00 |
| Grant HT-257 (C12) | 1,935.89* | 1,935.89 | ..... | ..... |
| Grant HT-257 (C13) | ..... | 25,000.00 | 23,505.59 | 1,494.41 |
| Grant HTS-5219 (C1) (S1) | 5,497.72 | ..... | 5,497.72 | ..... |
| Grant HTS-5219 (C2) | ..... | 30,000.00 | 20,822.00 | 9,178.00 |
| Grant HTS-5284 (C2) | 887.87 | ..... | 887.87 | ..... |
| Grant HTS-5284 (C3) | ..... | 7,603.82 | 14,402.59 | 6,798.77* |
| Grant HTS-5369 (C3) | ..... | 104,629.40 | 98,970.91 | 5,658.49 |
| Grant HTS-5369 (C2) | 2,149.72 | ..... | 2,149.72 | ..... |
| Grant HTS-5372 (C2) | 5,154.55 | ..... | 5,154.55 | ..... |
| Grant HTS-5372 (C3) | ..... | 29,115.00 | 26,418.84 | 2,696.16 |
| Grant HTS-5478 (C1) | ..... | 26,945.27 | 14,045.74 | 12,899.53 |
| Grant HTS-5478 (S1) | 1,220.95 | ..... | 1,220.95 | ..... |
| Grant K3-4416 (C3) (B) | 5,750.00 | ..... | 5,560.93 | 189.07 |
| Grant M 629 (C7) | 8,420.68 | ..... | 8,420.68 | ..... |
| Grant M 900 (C6) | 7,809.73* | 7,809.73 | ..... | ..... |
| Grant M 900 (C7) | 9,141.79 | 9,015.29 | 18,157.08 | ..... |
| Grant M 2850 (C2) | 294.24 | ..... | 294.24 | ..... |
| Grant M 3917 (C1) | 107.23 | ..... | 107.23 | ..... |
| Grant M 4453 | 1,976.68 | ..... | 1,976.68 | ..... |
| Grant M 4453 (C1) | 3,734.45 | 10,205.86 | 13,940.31 | ..... |
| Grant M 4849 | 997.04* | 997.04 | ..... | ..... |
| Grant M 5356 | 6,725.14 | ..... | 8,325.10 | 1,599.96* |
| Grant M 6022 | 1,238.23* | 15,145.00 | 13,095.58 | 811.19 |
| Grant 2M 5077 (C14) | 14,119.66 | ..... | 8,002.61 | 6,117.05 |
| Grant 2M-5077-C15 | ..... | 102,330.00 | 90,821.71 | 11,508.29 |
| Grant 2M 5972 (C7) | 3,790.14 | ..... | 3,790.14 | ..... |
| Grant 2M 5972 (C8) | 11,812.31 | ..... | 11,812.31 | ..... |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant 2M 5972 (C9) | ..... | 19,171.89 | 24,496.44 | 5,324.55* |
| Grant 2M 6144 (C7) | 9,060.54 | ..... | 9,060.54 | ..... |
| Grant 2M 6144 (C8) | ..... | 64,613.72 | 59,135.76 | 5,477.96 |
| Grant 2M 6427 (C3) | 2,222.00* | 2,222.00 | ..... | ..... |
| Grant 2M 6427 (C4) | 3,171.50 | ..... | 137.36 | 3,034.14 |
| Grant 2M 6427 (C5) | ..... | 20,000.00 | 20,365.62 | 365.62* |
| Grant 2M 6985 (C1) | 17.46* | 49.39 | 31.93 | ..... |
| Grant 2M 6985 (C2) | ..... | 13,032.00 | 24,926.78 | 11,894.78* |
| Grant 2M 7073 (C1) | 2,788.15* | 2,788.15 | ..... | ..... |
| Grant 2M 7073 (C2) | ..... | 34,509.79 | 34,126.88 | 382.91 |
| Grant 2M 7105 (C2) | 350.40 | ..... | 350.40 | ..... |
| Grant 2M 7105 (C3) | ..... | 47,060.40 | 45,346.08 | 1,714.32 |
| Grant 2M 7435 | 7,417.35 | ..... | 7,417.35 | ..... |
| Grant 2M 7435-C1 | ..... | 29,619.73 | 27,833.97 | 1,785.76 |
| Grant 2M 7823 | ..... | 29,443.00 | 27,965.00 | 1,478.00 |
| Grant 2M 7957 | ..... | 50,396.00 | 45,121.52 | 5,274.48 |
| Grant 2M 8000 | ..... | 22,728.00 | 22,438.69 | 289.31 |
| Grant MF 5787 (C1) | 444.46 | ..... | 468.64 | 24.18* |
| Grant MF 9240 (C1) | 181.75 | ..... | 181.75 | ..... |
| Grant MF 17377 | 197.57 | ..... | 197.57 | ..... |
| Grant MF 17,490 | ..... | 500.00 | 349.16 | 150.84 |
| Grant MH 00900-09 | ..... | 12,589.77 | 22,199.31 | 9,609.54* |
| Grant MH 03917-03 | 2,028.76 | 38,595.27 | 33,326.03 | 7,298.00 |
| Grant MH 03917-04 | ..... | 8,100.00 | 5,901.24 | 2,198.76 |
| Grant MH 04849-02 | 1,933.74 | 8,099.93 | 29,359.09 | 19,325.42* |
| Grant MH 04849-03 | ..... | ..... | 7,782.28 | 7,782.28* |
| Grant MH 05356-02 | ..... | 24,749.88 | 13,357.30 | 11,392.58 |
| Grant MH 06022-02 | ..... | 3,365.00 | 1,615.07 | 1,749.93 |
| Grant MH 06529-01 | ..... | 7,294.00 | 5,690.69 | 1,603.31 |
| Grant MH 06661-01 | ..... | 24,725.00 | 15,759.30 | 8,965.70 |
| Grant MH 06661-02 | ..... | ..... | 578.36 | 578.36* |
| Grant MH 07465-01 | ..... | ..... | 386.57 | 386.57* |
| Grant MH 07678-01 | ..... | 5,787.00 | 732.34 | 5,054.66 |
| Grant MH 07898-01 | ..... | 4,044.00 | 378.81 | 3,665.19 |
| Grant MH 09186-01 | ..... | ..... | 2,842.35 | 2,842.35* |
| Grant 5F1-MH-13,934-02 | ..... | ..... | 75.20 | 75.20* |
| Grant 5F3 MH-5787-02 | ..... | 500.00 | 105.03 | 394.97 |
| Grant 5F3 MH-18,193-02 | ..... | 500.00 | ..... | 500.00 |
| Grant K3 MH-19,523-01 | ..... | ..... | 2,323.60 | 2,323.60* |
| Grant MPD-17,377-C1 | ..... | 500.00 | 489.60 | 10.40 |
| Grant MPM-13,327-C1 | ..... | 425.00 | 425.00 | ..... |
| Grant MPM-13,934-R1 | ..... | 500.00 | 96.20 | 403.80 |
| Grant MPM-14,873-C1 | ..... | 6,700.00 | 5,219.33 | 1,480.67 |
| Grant MPM-18,570 | ..... | 500.00 | 57.94 | 442.06 |
| Grant MR 04453-03 | ..... | 15,743.49 | 10,154.89 | 5,588.60 |
| Grant MSP-18,193 | ..... | 500.00 | 500.00 | ..... |
| Grant MY 2061 (C3) | 491.35* | 491.35 | ..... | ..... |
| Grant NBI-EP 1 F2 NB 19,756-01 | ..... | ..... | 344.71 | 344.71* |
| Grant NBI-EP-BF 6336 (C3) | 48.81 | ..... | 17.30 | 31.51 |
| Grant NBI-EP-BF 14552 | 230.00 | ..... | 230.00 | ..... |
| Grant NBI-EP-BPD-6336 (C4) | ..... | 500.00 | 179.29 | 320.71 |
| Grant NB 00669 (09) | 261.90* | 13,219.00 | 12,504.52 | 452.58 |
| Grant NB 00669 (10) | ..... | ..... | 812.01 | 812.01* |
| Grant NB 01161 (07) | ..... | 5,027.00 | 4,747.20 | 279.80 |
| Grant NB 02324-04 | ..... | 392.50 | 392.50 | ..... |
| Grant NB 02365-06 | 2,246.41 | 44,316.62 | 41,825.93 | 4,737.10 |
| Grant NB 02365-07 | ..... | 9,771.00 | 10,470.16 | 699.16* |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant NB 02369-07 | ..... | 2,339.70 | 1,576.22 | 763.48 |
| Grant NB 02434-04 | ..... | 2,185.00 | 2,496.35 | 311.35* |
| Grant NB 02793-03 | ..... | 9,784.86 | 12,016.12 | 2,231.26* |
| Grant NB 03261-02 | 643.20* | 9,595.33 | 7,530.86 | 1,421.27 |
| Grant NB 03261-03 | ..... | 2,563.00 | 18.20 | 2,544.80 |
| Grant NB 03437-02 | ..... | 14,479.30 | 9,348.49 | 5,130.81 |
| Grant NB 03670-03 | ..... | ..... | 1,222.16 | 1,222.16* |
| Grant NB 03799-02 | 2,436.66 | 16,451.58 | 17,336.90 | 1,551.34 |
| Grant NB 03897-02 | ..... | 2,990.00 | 777.88 | 2,212.12 |
| Grant NB 04368-01 | ..... | 9,084.00 | 52.33 | 9,031.67 |
| Grant NB-19,756-01 | ..... | 500.00 | ..... | 500.00 |
| Grant NB-K6-16,677 | ..... | 14,297.00 | 14,521.32 | 224.32* |
| Grant NT11 (C5) | 14,582.01 | ..... | 14,582.01 | ..... |
| Grant NT-11-06 | ..... | 12,700.00 | 10,100.01 | 2,599.99 |
| Grant NTST 445 | 876.00 | ..... | 876.00 | ..... |
| Grant NTST 539 | 600.00 | ..... | 600.00 | ..... |
| Grant OG5 | 75,557.10 | 56,075.00 | 131,632.10 | ..... |
| Grant OM 362 (C2) | 6,128.82 | ..... | 6,128.82 | ..... |
| Grant PX 406-8 & FG613 | 926.97 | ..... | 926.97 | ..... |
| Grant RG 91 (C15) | 25,294.15 | ..... | 25,074.15 | 220.00 |
| Grant RG 4203 (C6) | 2,902.04 | ..... | 2,902.04 | ..... |
| Grant RG 4203 (C7) | 4,579.97 | 2,898.05 | 7,478.02 | ..... |
| Grant RG 4656 (C4) | 799.93 | ..... | 799.93 | ..... |
| Grant RG 4758 (C5) | 7,514.61 | ..... | 7,514.61 | ..... |
| Grant RG 5508 (C4) | 3,088.88 | 2,895.09 | 5,969.38 | 14.59 |
| Grant RG 5509 (C3) | 21.95 | ..... | 21.95 | ..... |
| Grant RG 6242 (C1) | 472.43* | 472.43 | ..... | ..... |
| Grant RG 6242 (C2) | 2,634.79* | 2,634.79 | ..... | ..... |
| Grant RG 6628 (C1) | 168.64 | ..... | 168.64 | ..... |
| Grant RG 6628 (C2) | 2,753.56 | 162.11 | 2,915.67 | ..... |
| Grant RG 6753 (C1) | 3,001.65 | ..... | 3,001.65 | ..... |
| Grant RG 6753 (C2) | 1,428.20 | 6,744.11 | 8,172.31 | ..... |
| Grant RG 6975 (C1) | 5,726.64 | 1,146.50 | 6,741.14 | 132.00 |
| Grant RG 6975 (R1) | 80.76 | ..... | 80.76 | ..... |
| Grant RG 7250 | 604.82* | 604.82 | ..... | ..... |
| Grant RG 7250 (C1) | 7,156.36 | 2,605.26 | 8,379.48 | 1,382.14 |
| Grant RG 7290 (C1) | 21,812.85 | ..... | 21,812.85 | ..... |
| Grant RG 7528 | 8,544.93 | ..... | 8,544.93 | ..... |
| Grant RG 7653 | 2,740.41 | ..... | 2,740.41 | ..... |
| Grant RG 7653 (C1) | 4,147.62 | 5,564.50 | 9,712.12 | ..... |
| Grant RG 8345 | 4,106.14 | ..... | 4,106.14 | ..... |
| Grant RG 8670 | 2,934.60 | ..... | 1,778.73 | 1,155.87 |
| Grant RG 8702 | 64.26* | 64.26 | ..... | ..... |
| Grant RG 8803 | 5,935.99 | ..... | 5,935.99 | ..... |
| Grant RG 8823 | 34,085.86 | ..... | 33,858.38 | 227.48 |
| Grant RG 9389 | 4,369.91 | 2,790.09 | 7,160.00 | ..... |
| Grant RG 9730 | 5,061.84 | 20,628.00 | 24,567.49 | 1,122.35 |
| Grant RG 9767 | 3,833.33 | 12,750.00 | 14,907.14 | 1,676.19 |
| Grant WP 316 | 972.22* | 12,785.00 | 10,335.05 | 1,477.73 |
| Grant WP-003160-2 | ..... | 3,335.00 | ..... | 3,335.00 |
| Total Governmental | $1,802,910.87 | $9,364,212.69 | $9,998,752.21 | $1,168,371.35 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| Name of Fund | Balance July 1, 1962 | Received | Disbursed | Balance June 30, 1963 |
|---|---|---|---|---|
| Abbott Laboratories Grant DA-759 | $ 3,248.83 | $ 9,500.00 | $ 6,207.98 | $ 6,540.85 |
| Abrams Foundation Rule of Law Communciation Center Grant to Dr. Arthur Larson | 1,215.00* | 1,215.00 | ..... | ..... |
| Accounting Faculty Discretionary Fund | 637.30 | 487.62 | 428.95 | 695.97 |
| George Garland Allen Memorial Fund | 24,123.21 | 1,000.00 | ..... | 25,123.21 |
| Air Force Basic Cadet Fund | 3,174.34 | 4,811.02 | 3,656.44 | 4,328.92 |
| Allied Chemical Corporation Fellowship | 6,273.55 | ..... | 6,288.06 | 14.51* |
| Allied Chemical Corporation Grant to Dr. L. A. Bigelow | 2,000.00 | ..... | 1,582.67 | 417.33 |
| American Cancer Society Grant: | | | | |
| Grant E 84 A | ..... | 23,484.00 | 18,240.74 | 5,243.26 |
| Grant E-84 A | 973.50* | 973.50 | ..... | ..... |
| Grant E-213 | 3,421.18 | ..... | 3,421.18 | ..... |
| Grant E-213 A | ..... | 8,419.00 | 6,800.30 | 1,618.70 |
| Grant E 238 A | 3,563.07 | 5,500.00 | 7,983.07 | 1,080.00 |
| Grant IN-61 | 135.88* | 135.88 | ..... | ..... |
| Grant IN-61B | 11,855.74 | 1,978.42 | 13,834.16 | ..... |
| Grant IN-61C | ..... | 25,021.06 | 10,063.24 | 14,957.82 |
| Grant P-166 | 58.46 | ..... | ..... | 58.46 |
| Grant P-166C | 7,150.73 | 7,363.62 | 14,514.35 | ..... |
| Grant P-166D | ..... | 7,374.00 | 2,562.95 | 4,811.05 |
| Grant P-221B | ..... | 5,634.00 | 10,397.11 | 4,763.11* |
| Grant T-237 | ..... | 10,881.00 | 10,802.54 | 78.46 |
| Grant T-237A | ..... | 5,164.00 | 2,797.13 | 2,366.87 |
| Grant T-251 | ..... | 43,139.64 | 44,584.74 | 1,445.10* |
| American Chemical Society Grant PRF-409-A | 8,812.11 | 6,600.00 | 7,564.26 | 7,847.85 |
| American Cyanamid Company Faculty Support Grant | 2,500.00 | 3,500.00 | 1,933.56 | 4,066.44 |
| American Cyanamid Company Graduate Fellowship in Chemistry Fund | 1,467.00 | ..... | 1,467.00 | ..... |
| American Diabetes Association Grant to Dr. F. L. Engel | 359.99 | ..... | 151.26 | 208.73 |
| American Heart Association: | | | | |
| Grant 57-G168 | 44.78 | ..... | 44.78 | ..... |
| Grant 59-G9 | ..... | 4,290.00 | 4,333.79 | 43.79* |
| Grant 60-G134 | 44.49 | ..... | 44.49 | ..... |
| Grant 60-G134 | ..... | 5,720.00 | 5,507.02 | 212.98 |
| Grant 62-G173 | ..... | 2,000.00 | 1,330.79 | 669.21 |
| Grant to Dr. Samuel J. Friedberg | ..... | 1,000.00 | 1,009.54 | 9.54* |
| Metabolism Study Fund | ..... | .54 | .54 | ..... |
| American Medical Association Grant-in-Aid | ..... | 5.73 | 5.73 | ..... |
| Anatomy Department Postgraduate Fund | 4,047.22 | 3,202.33 | 6,175.86 | 1,073.69 |
| Anesthesia and Surgical Appliance Research Fund | 5,008.34 | ..... | 1,445.00 | 3,563.34 |
| Approved Supply Pastors' School Fund | 14,118.69 | 19,953.98 | 25,617.97 | 8,454.70 |
| Art Center Building Fund | 354,964.74 | 52,629.17 | ..... | 407,593.91 |
| Art Collection Fund | 253.34 | 174.00 | ..... | 427.34 |
| Arthritis and Rheumatism Foundation Fellowship to Robert Cherniak | ..... | 500.00 | 38.18 | 461.82 |
| Asia Foundation: | | | | |
| Book Account Fund | 39.09 | ..... | 39.09 | ..... |
| Grant to Dr. Hwa Wen Lai | ..... | 1,735.00 | 1,455.00 | 280.00 |
| Associates of the Trent Collection Fund | 253.22 | 1,188.00 | 2,031.05 | 589.83* |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Ayerst Laboratories: | | | | |
| Grant to Division of Anesthesiology | 2,255.40 | 3,000.00 | 2,747.48 | 2,507.92 |
| Endocrine Research Fund | 230.99 | 3,600.00 | 1,945.86 | 1,885.13 |
| Babcock Foundation World Rule of Law Fund | 28,068.75 | 30,647.19 | 31,806.36 | 26,909.58 |
| Baxter Laboratories, Inc. Pyromen Studies Fund | 57.24 | ..... | 48.95 | 8.29 |
| George Baylin Radiology Research Fund | 166.87 | ..... | 45.00 | 121.87 |
| Dorothy Beard Research Fund | 164,257.92 | 4,805.07 | 11,299.82 | 157,763.17 |
| Bell Telephone Laboratory Grant to the Department of Electrical Engineering | ..... | 7,312.50 | 600.00 | 6,712.50 |
| Mary Duke Biddle Foundation: | | | | |
| Art Center Consultation Fund | 5,060.72 | 17,750.00 | 19,494.67 | 3,316.05 |
| Art Center Planning Consultation Fund | 41,293.42 | ..... | 34,887.08 | 6,406.34 |
| Art Exhibit Fund | 1,930.96 | 4,500.00 | 5,073.61 | 1,357.35 |
| Susan Dees Project Fund | 4,731.10 | ..... | 4,731.10 | ..... |
| Department of Anatomy Fund | 1,500.00 | ..... | 344.95 | 1,155.05 |
| Division of Urology Fund | 37,561.44 | 18,855.00 | 6,937.83 | 49,478.61 |
| Grant to the Sarah P. Duke Gardens | 21,930.05 | 25,000.00 | 23,828.51 | 23,101.54 |
| Grant to the D. U. Library | ..... | 2,000.00 | 1,809.24 | 190.76 |
| Grant to the D. U. Medical Center Library | ..... | 5,787.64 | 3,734.30 | 2,053.34 |
| Grant to the D. U. Religious Council | ..... | 700.00 | ..... | 700.00 |
| Grant to the Hanes Committee | ..... | 1,000.00 | ..... | 1,000.00 |
| Grant for Health Team Fund | 5,747.94 | ..... | 5,828.29 | 80.35* |
| Grant for Medical Library Acquisitions | ..... | 10,000.00 | 10,000.00 | ..... |
| Grant to Angus McBryde | ..... | 1,500.00 | 1,706.87 | 206.87* |
| Grant to Dr. Blaine Nashold | ..... | 2,500.00 | 1,273.86 | 1,226.14 |
| Grant to Dr. Galen W. Quinn | 730.45 | ..... | ..... | 730.45 |
| Grant for Research and Service in Sterility Fund | 10,000.00 | ..... | 5,130.04 | 4,869.96 |
| Grant for Television Equipment | 28,382.00 | 207.11 | 28,589.11 | ..... |
| Grant for Television Laboratory Equipment | ..... | 11,500.00 | ..... | 11,500.00 |
| Medical Library Fund | 800.00 | 18,138.06 | 18,289.45 | 648.61 |
| Medical Library Planning Consultants Fund | 17,223.22 | ..... | 27,319.52 | 10,096.30* |
| Music Lectureships | ..... | 1,750.00 | 1,700.00 | 50.00 |
| Patient Education Fund | 6,200.00 | 2,300.00 | 3,912.12 | 4,587.88 |
| Professorship In Music Fund | 31,097.00 | 50,466.45 | 33,348.09 | 48,215.36 |
| Biochemistry Department Fund | 351.13 | 1,125.31 | 232.05 | 1,244.39 |
| William Blackburn Project Fund | ..... | 200.00 | 100.00 | 100.00 |
| Borden Undergraduate Award in Medicine Fund | 1,020.30 | 2,500.00 | 500.00 | 3,020.30 |
| Botany Department Equipment Fund | ..... | 4,000.00 | ..... | 4,000.00 |
| Earl & Blanche Brian Research in Leukemia Fund | 9,500.00 | ..... | 7,700.73 | 1,799.27 |
| Frank C. Brown Folklore Collection Fund | 1,970.98 | ..... | ..... | 1,970.98 |
| Brunswick Pulp and Paper Co. Fellowship for Hardwood Silviculture Research Fund | 641.97 | 1,250.00 | 1,027.00 | 864.97 |
| CBS Foundation, Inc. Obstetrics Fund | 117.40 | ..... | 122.91 | 5.51* |
| California Research Corporation Grant to Dr. Walter Gordy | 182.76 | ..... | 20.00 | 162.76 |
| Cardiopulmonary Research Fund | 1,750.00 | ..... | 208.07 | 1,541.93 |
| Cardiovascular Research Fund | 8,344.34 | 10,531.15 | 15,984.13 | 2,891.36 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Carnegie Corporation Commonwealth Studies Fund | 105,295.27 | 63,590.36 | 54,883.40 | 114,002.23 |
| Soviet International Law Doctrine Fund | ..... | 13,000.00 | ..... | 13,000.00 |
| Catalogue for the Trent Collection Fund | 1,586.89 | ..... | .42 | 1,586.47 |
| Catechol Amine Research Fund | 6,461.72 | 9,250.21 | 10,538.82 | 5,173.11 |
| Check List for Scientific Periodicals Fund | 47.33 | ..... | .60 | 46.73 |
| Chemistry Department Library Fund | 104.84 | 136.02 | 9.99 | 230.87 |
| Chemstrand Corporation Chemistry Fund | 975.30 | ..... | 475.30 | 500.00 |
| Chemstrand Research Grant to Dr. W. R. Krigbaum | ..... | 8,200.00 | 6,643.99 | 1,556.01 |
| China Medical Board Grant for Microbiology | 1,023.51 | ..... | 819.66 | 203.85 |
| Choral Music Fund | 2,257.50 | 2,500.00 | 709.62 | 4,047.88 |
| Christian Convocation Fund | 1,002.35 | 1,453.00 | 1,915.34 | 540.01 |
| Ciba Pharmaceutical Products, Inc.: | | | | |
| Grant to Dr. Ivan Brown | 2,000.00 | ..... | 1,997.48 | 2.52 |
| Grant to Division of Anesthesia | 335.54 | ..... | ..... | 335.54 |
| Grant to Dr. Henry McIntosh | ..... | 2,500.00 | 1,915.38 | 584.62 |
| Hypertension Research Fund | 6,289.25 | ..... | 1,605.26 | 4,683.99 |
| Clinical Chemistry Fund | 2,987.50 | 10,594.07 | 9,045.29 | 4,536.28 |
| Clinic in Preaching Fund | 1,538.59 | ..... | 1,538.59 | ..... |
| T. S. Coile Forestry Research Fund | ..... | 400.00 | 222.73 | 177.27 |
| Cold Spring Harbor Laboratory Fund | ..... | 25,000.00 | ..... | 25,000.00 |
| Buddy Cole Memorial Fund for Children's Diseases Fund | 2,463.60 | 300.00 | ..... | 2,763.60 |
| Commonwealth Fund: | | | | |
| Experimental Training Program | 34,349.48 | 120,000.00 | 81,807.44 | 72,542.04 |
| Fellowship to J. B. Wyngaarden | ..... | 15,746.00 | 2,010.53 | 13,735.47 |
| Compton Rule of Law Fund | 7,684.97 | 13,148.89 | 7,566.79 | 13,267.07 |
| Continuous Forest Inventory Pool Fund | 562.00 | ..... | ..... | 562.00 |
| Coordinated Rehabilitation Research Fund | 432.36* | 24,048.93 | 12,633.64 | 10,982.93 |
| Cosmetic Frosthetic Restoration Revenue Fund | ..... | 402.00 | ..... | 402.00 |
| Crippled Children's Spastic Orthopedic Fund | 26,651.52 | ..... | ..... | 26,651.52 |
| Current Thought on Peace & War Fund | 24.05* | 24.05 | ..... | ..... |
| Cutter Laboratories Plasmanate Research Fund | 469.28 | ..... | ..... | 469.28 |
| Cystic Fibrosis Fund | ..... | 1,405.00 | ..... | 1,405.00 |
| Carl Henry Davis Memorial Film Collection Fund | 4,100.00 | ..... | ..... | 4,100.00 |
| Department of Surgery Fund | 590,756.84 | 106,854.48 | 196,399.42 | 501,211.90 |
| Dermatology Research Fund | 13,317.01 | 11,250.00 | 7,060.84 | 17,506.17 |
| Dining Halls Betterment Fund | 144,898.36 | ..... | 190,218.61 | 45,320.25* |
| Disarmament Treaties and Individual Violations Fund | ..... | 2,500.00 | 316.13 | 2,183.87 |
| Divinity School Fund | 3,025.10 | 10,050.00 | 7,781.36 | 5,293.74 |
| Divinity School Summer Clinic Fund | ..... | 2,123.70 | ..... | 2,123.70 |
| Doctoral Dissertation Microfilming Fund | 4,100.80 | 3,344.56 | 3,703.74 | 3,741.62 |
| Dreyfus Foundation Grant to Chemistry Department | ..... | 5,000.00 | 2,213.37 | 2,786.63 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Duke Chapter Student American Medical Association Fund | 2,454.40 | | 52.40 | 2,402.00 |
| Duke Divinity School Building Fund | | 15,770.00 | | 15,770.00 |
| Duke Endowment: | | | | |
| Consultants Fund | 6.00* | 20,364.00 | 20,358.00 | |
| Discretionary Fund | | 50,000.00 | 25,000.00 | 25,000.00 |
| Grant for the Development Campaign | 37,749.91 | 160,000.00 | 110,087.41 | 87,662.50 |
| Grant for Medical Center Planning | 1,343.01 | | 2,977.20 | 1,634.19* |
| Professorship Fund | | 60,000.00 | 48,531.00 | 11,469.00 |
| Duke Forest Fund | 49,354.93 | | | 49,354.93 |
| Doris Duke Foundation: | | | | |
| Children's Teaching Program Grant | 1,392.56 | | 366.59 | 1,025.97 |
| Grant to Department of Ophthalmology | 817.80 | 500.00 | | 1,317.80 |
| Pediatrics Study Fund | 9,353.56 | | | 9,353.56 |
| Professorship Fund | 149,712.00 | | 300.00 | 149,412.00 |
| Teaching Program in Infectious Diseases | 3,218.70 | | 871.44 | 2,347.26 |
| Unrestricted Gift Fund | 33,315.31 | | | 33,315.31 |
| Duke Poison Control Center Fund | | 2,180.18 | 857.34 | 1,322.84 |
| Duke Hospital Chapel Fund | 4,218.80 | 1,805.78 | 1,492.13 | 4,532.45 |
| Duke Hospital Social Service Fund | 75,310.46 | 31,450.14 | 26,735.15 | 80,025.45 |
| Duke Medical Student Government Association Fund | 5,218.70 | | | 5,218.70 |
| Duke Memorial Etching Fund | 148.75 | 34.92 | 15.00 | 168.67 |
| Benjamin N. Duke Professorship in Art Fund | 19,650.02 | 28,966.44 | 27,914.92 | 20,701.54 |
| Duke University Development Fund | 265.00 | 25.00 | | 290.00 |
| Duke University Plate Fund | 416.74 | 1,093.72 | 89.76 | 1,420.70 |
| E. I. DuFont deNemours: | | | | |
| Anesthesia Grant | 6,041.63 | 1,000.00 | 7,511.26 | 469.63* |
| Grant for Advancing Undergraduate Teaching | 7,730.22 | 4,000.00 | 2,239.43 | 9,490.79 |
| Grant for Fundamental Research in Chemistry Fund | 11,256.76 | 5,000.00 | 7,611.89 | 8,644.87 |
| Postgraduate Fellowship in Chemistry Fund | 3,171.52 | 2,660.00 | 3,134.48 | 2,697.04 |
| Postgraduate Fellowship in Physics Fund | 5,469.44 | 2,660.00 | 4,469.30 | 3,660.14 |
| Summer Research Fund | 130.03* | 130.03 | | |
| Durham Cerebral Palsy Foundation: | | | | |
| Grant to Dr. Leonard Goldner | 101.87 | | 47.28 | 54.59 |
| Durham County History Project Fund | 200.00 | | | 200.00 |
| Durham Orange County Heart Association | | | | |
| Grant to Dr. W. H. Knisely | 17.12 | | 17.12 | |
| Eastman Kodak Company Resarch Grant | | 6,000.00 | 250.00 | 5,750.00 |
| E. E. G. Laboratory Account Fund | 3,125.19 | 31,808.01 | 23,177.61 | 11,755.59 |
| E. E. G. Symposium Fund | 3,750.00 | 594.00 | 3,333.98 | 1,010.02 |
| Electronics Shop Fund | 3,473.86 | | 471.06 | 3,002.80 |
| Endocrinology Laboratory Fund | 868.43* | 7,279.18 | 4,776.04 | 1,634.71 |
| Endometrial Study Grant | 272.82 | | 272.82 | |
| Engineering College Research Fund | 5,026.56 | 87.50 | 678.77 | 4,435.29 |
| Esso Education Grant to Chemistry Department | 908.34* | 3,908.34 | 85.00 | 2,915.00 |
| Esso Education Foundation Grant for Science and Engineering | 5,040.76 | | 670.18 | 4,370.58 |
| Ford Commonwealth Studies International Relations Fund | 73,645.69 | 105,652.00 | 46,512.71 | 132,784.98 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Ford Foundation: | | | | |
| Behavioral Science Fund | 456.17 | ..... | 117.47 | 338.70 |
| Faculty Research Fellowship for Dr. C. E. Ferguson | 2,490.50 | ..... | 2,490.50 | |
| Faculty Research Fellowship to Dr. Lloyd Saville | 14,385.00 | ..... | 11,993.00 | 2,392.00 |
| Fellowships for 1960-61 | 926.40 | ..... | 926.40 | |
| Fellowship for Dr. James M. Folsam | | 6,738.00 | ..... | 6,738.00 |
| Grant for Graduate Research Seminars in Economics | 9,096.02 | ..... | 8,905.29 | 190.73 |
| Grant for Research in Public Affairs | 32,038.82 | ..... | 9,543.87 | 22,494.95 |
| Grant for Summer Faculty Research Seminar in Economics for 1961 | 4,513.14 | ..... | 4,513.14 | ..... |
| Grant to Dr. C. B. Hoover | 1,461.56 | ..... | 1,461.56 | ..... |
| Grant to Dr. J. J. Spengler | 804.29 | ..... | 127.62 | 676.67 |
| Honors-Masters Program | 53,027.65 | ..... | 24,161.99 | 28,865.66 |
| Medical School Income Fund | 35,005.68 | ..... | ..... | 35,005.68 |
| Socio-Economic Studies of Aging Fund | 23,734.71 | 15,000.00 | 15,428.09 | 23,306.62 |
| Sovereignty Under the Law Fund | 412.68 | 8,500.00 | 2,752.59 | 6,160.09 |
| Teacher Education Grant | 92,141.30 | ..... | 54,239.28 | 37,902.02 |
| Forest Operations for Duke Power Company Fund | 19,223.36 | 375.00 | 6,024.75 | 13,573.61 |
| Forest Soils Drainage Research Fund | 248.20 | ..... | ..... | 248.20 |
| Forestry Bulletin Fund | 9,617.28 | 1,218.79 | 1,011.46 | 9,824.61 |
| Forestry School Fund | 208.59 | 116.00 | 39.33 | 285.26 |
| Forestry School Scholarship Fund | 800.00* | 800.00 | ..... | ..... |
| Foundations Fund for Research in Psychiatry Grant B-58-04 | 4,328.30 | ..... | 4,211.05 | 117.25 |
| Herman Frasch Foundation: | | | | |
| Grant #2 to Dr. A. W. Naylor | ..... | 10,000.00 | 8,791.74 | 1,208.26 |
| Research Fund | 634.77 | ..... | 634.77 | ..... |
| Friends of Duke University Library Fund | 2,921.24 | 2,648.92 | 474.72 | 5,095.44 |
| Fund for the Advancement of Education-Political Science Teaching | 463.38 | ..... | 132.90 | 330.48 |
| General Alumni Fund | 11,612.41 | 2,151.82 | 1,506.80 | 12,257.43 |
| General Electric Foundation: | | | | |
| Grant for Research in Behavioral Science | ..... | 5,000.00 | 4,349.96 | 650.04 |
| Grant to Martin Black | 915.58 | ..... | 845.78 | 69.80 |
| Grant in Physics | 3,328.15 | 5,000.00 | 794.50 | 7,533.65 |
| General Foods Corporation Research Fund | 31.83 | ..... | 31.83 | ..... |
| Georgiade Plastics Research Fund | 9,374.64 | 15,499.39 | 1,187.08 | 23,686.95 |
| Gifts for Research in Obstetrics and Gynecology Fund | 10,629.84 | ..... | ..... | 10,629.84 |
| Graduate School Dean's Discretionary Fund | ..... | 150.00 | ..... | 150.00 |
| Graduate Student Thesis Binding Fund | ..... | 1,060.00 | 15.00 | 1,045.00 |
| Graduate School Thesis Fund | 9,234.34 | 2,950.00 | 3,245.24 | 8,939.10 |
| James A. Gray Fund | 24,508.04 | 11,455.62 | 5,829.23 | 30,134.43 |
| Gynecology and Obstetrics Special Fund | 28,359.99 | 34,299.28 | 37,463.16 | 25,196.11 |
| John M. Hammer Fund | 135.93 | ..... | ..... | 135.93 |
| Anna H. Hanes Research Fund | 1,174,635.84 | 262,541.49 | 280,161.37 | 1,157,015.96 |
| F. M. Hanes: | | | | |
| Bequest to the Department of Medicine Fund | 12,504.53 | 56,469.02 | 59,708.85 | 9,264.70 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Bequest to the School of Medicine Fund | 19,624.99 | 27,968.55 | 8,161.71 | 39,431.83 |
| Bequest to School of Medicine Grant#1 to Dr. E. Croft Long | 580.73 | 469.05 | 1,049.78 | |
| Bequest to School of Medicine #2 to Dr. C. R. Stephen | ..... | 1,000.00 | 1,000.00 | ..... |
| Garden Memorial Fund | 188.55 | ..... | 188.55 | ..... |
| Memorial Trust Fund | 11,161.25 | 3,647.83 | ..... | 14,809.08 |
| P. Huber Hanes Publication Fund | 1,251.48 | 1,257.57 | 2.22 | 2,506.83 |
| J. Welch Harriss Library Book Fund | ..... | 100.00 | 41.75 | 58.25 |
| Harvard University Grant to Professor T. F. Keller | ..... | 1,065.00 | 1,065.00 | ..... |
| Hematology Research Fund | 3,088.34 | 2,192.94 | 1,415.66 | 3,865.62 |
| Frank S. Hickman Prizes in Preaching Fund | 70.00 | ..... | ..... | 70.00 |
| Hoffman-LaRoche, Inc. Grant to Dr. W. G. Anlyan | 91.09 | ..... | 78.40 | 12.69 |
| Hoffman-LaRoche, Inc. Urology Research Fund | 1,124.81 | ..... | 1,124.81 | ..... |
| Calvin B. Hoover Research Fund | 5,000.00 | 5,000.00 | 5,312.33 | 4,687.67 |
| Horneman Research Fund | 13,049.06 | ..... | ..... | 13,049.06 |
| Hospital Administration Fund | 55,352.79 | 23,435.92 | 10,920.82 | 67,837.89 |
| Hospital Air Conditioning Service Fund | 2,308.53 | ..... | ..... | 2,308.53 |
| Hospital Blood Bank Fund | 47,493.30 | 102,234.89 | 99,428.84 | 50,299.35 |
| Hospital Dietetics Interns Fund | 552.68 | ..... | 226.60 | 326.08 |
| Hospital Laundry Equipment Reserve Fund | 36,697.00* | 12,000.00 | ..... | 24,697.00* |
| Hospital Library Lost Book Fund | 224.45 | 154.10 | 204.46 | 174.09 |
| Hospital Television Service Fund | 25,104.77 | 18,598.00 | 6,063.81 | 37,638.96 |
| Industrial Research Fund | 28,385.45 | 10,000.00 | 11,328.05 | 27,057.40 |
| Industrial Waste Conference | 552.80 | 566.60 | 128.08 | 991.32 |
| Walker P. Inman: | | | | |
| Grant to Dr. K. D. Hall | 1,220.50 | ..... | 1,000.00 | 220.50 |
| Grant to Dr. D. A. Howell | 360.62* | 360.62 | ..... | ..... |
| Grant to Dr. W. H. McCrae | 256.78 | 253.60 | 510.38 | ..... |
| Grant to Dr. W. C. Sealy | ..... | 7,500.00 | 7,240.84 | 259.16 |
| Grant to Dr. C. R. Stephen | ..... | 3,500.00 | ..... | 3,500.00 |
| Memorial Grant | ..... | 1,206.37 | ..... | 1,206.37 |
| Institute for International Order: | | | | |
| Grant to Dr. Arthur Larson | 2,336.19 | ..... | 36.51 | 2,299.68 |
| United Nations Publication Fund | 631.28 | 3,066.90 | 16.12 | 3,682.06 |
| International Greek New Testament Project | ..... | 1,500.00 | 200.00 | 1,300.00 |
| Japan Society, Inc. Grant | 180.05 | ..... | 4.37 | 175.68 |
| Johnson Foundation, Inc. Publication Fund | ..... | 9,100.00 | 6,635.00 | 2,465.00 |
| Kappa Kappa Gamma Award Fund | 947.52 | .64 | 948.16 | ..... |
| Kellogg Foundation Hospital Administration Fund | ..... | 30,000.00 | 10,704.55 | 19,295.45 |
| Johnny Klein Heart Research Fund | 1,517.50 | 1,796.29 | ..... | 3,313.79 |
| Koppers Foundation Grant to Department of Chemistry | 300.00 | ..... | 300.00 | ..... |
| Seymour Korkes Memorial Lecture Fund | 181.65 | ..... | 9.15 | 172.50 |
| J. Walter Lambeth Library Collection Fund | 19,397.49 | ..... | 1,159.30 | 18,238.19 |
| Law Library Lost Book Fund | 37.75 | ..... | ..... | 37.75 |
| Law School Dean's Fund | 4,034.66 | 384.45 | 345.38 | 4,073.73 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Law School Research Fund | ..... | 1,647.59 | 150.39 | 1,497.20 |
| Lawyers Title Foundation Prize Fund | ..... | 100.00 | 100.00 | ..... |
| Sydney Irwin LeBauer Memorial Fund | 25.00 | ..... | ..... | 25.00 |
| Lederle Laboratories: | | | | |
| Medical Faculty Award to Dr. Jack L. Kostyo | 21,431.72 | ..... | 9,928.18 | 11,503.54 |
| Medical Student Fellowship Research Fund | 900.00 | 1,200.00 | 1,300.00 | 800.00 |
| "What Goes On" Fund | 2,210.46* | 24,000.00 | 22,384.70 | 595.16* |
| Robert E. Lee Prize Fund | 50.00 | 50.00 | 50.00 | 50.00 |
| Library Fee Fund | 31,588.86 | 45,475.00 | 63,048.59 | 14,015.27 |
| Library Fee Reserve Fund | 2,038.87 | ..... | 42.00 | 1,996.87 |
| Life Insurance Medical Research Fund: | | | | |
| Cardi vascular and Respiratory Research Fund | 10,992.93* | 12,100.00 | 251.31 | 855.76 |
| Grant G-62-7 | ..... | 4,400.00 | 2,196.13 | 2,203.87 |
| Grant G-62-8 | ..... | 13,200.00 | 16,138.69 | 2,938.69* |
| Grant G-62-9 | ..... | 12,375.00 | 11,500.21 | 874.79 |
| Lilly Endowment Grant for Research in Government | 31,766.35 | 28,739.35 | 12,521.58 | 47,984.12 |
| Loblolly Pine Monograph Fund | 813.76 | ..... | 500.92 | 312.84 |
| Lost Book Fund | 3,388.00 | 6,761.94 | 4,355.89 | 5,794.05 |
| Lutheran Student Gift Fund | 54.83 | ..... | ..... | 54.83 |
| John and Mary R. Markle Foundation: | | | | |
| Fellowship to Dr. S. I. Cohen | 12.00 | ..... | 12.00 | ..... |
| Fellowship to Dr. Suydam Osterhout | 5,259.11 | ..... | 5,763.78 | 504.67* |
| Fellowship to Dr. D. L. Stickel | 6,000.00 | ..... | 3,298.86 | 2,701.14 |
| Fungus Research Fund | 2,070.72 | ..... | 337.00 | 1,733.72 |
| Mathematics Department Equipment Fund | ..... | 2,740.00 | ..... | 2,740.00 |
| Mathematics Mural Fund | 600.00 | ..... | ..... | 600.00 |
| George W. Matheson Memorial Fund | 1.72 | 398.09 | 390.64 | 9.17 |
| William McDougall Research Fund | 39,306.57 | 54,035.80 | 71,676.79 | 21,665.58 |
| Martha Cozart McLeod Memorial Fund | 625.50 | ..... | ..... | 625.50 |
| Mead Johnson and Company: | | | | |
| Isoxsuprine Research Fund | 200.00 | ..... | 200.00 | ..... |
| Medical Fund | 3,603.98 | ..... | 490.87 | 3,113.11 |
| Pediatric Program Fund | 2,913.21 | 500.00 | 495.00 | 2,918.21 |
| Medical Record Library Fund | 1,452.65 | ..... | 343.59 | 1,109.06 |
| Medical Research Fund | 66,096.84 | 25,389.80 | 30,902.46 | 60,584.18 |
| Medical School Class of 1951 Fund | 3,226.72 | ..... | 3,226.72 | ..... |
| Medical School Discretionary Fund | 120.00 | 10.00 | ..... | 130.00 |
| Medical School Library Committee Fund | 851.48 | ..... | 629.04 | 222.44 |
| Medical School Miscellaneous Fund | 159.50 | ..... | 74.26 | 85.24 |
| Merck and Company Dornovac Fund | 3,080.24 | ..... | 3,080.24 | ..... |
| Merrill-Renzulli Foundation Pediatric Fund | 5,000.00 | ..... | ..... | 5,000.00 |
| Methodist Board of Education Book Fund | 4,476.43 | ..... | 2,027.84 | 2,448.59 |
| Methodist Christian Higher Education Fund | 107,006.52 | 18,706.57 | 160.30 | 125,552.79 |
| Methodist Church Divinity School Fund | ..... | 94,500.00 | 94,500.00 | ..... |
| Methodist Church Divinity School Pension Fund | 1,547.00 | ..... | 685.91 | 861.09 |
| Miscellaneous Awards and Prizes | ..... | 1,675.00 | 1,632.00 | 43.00 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Monsanto Chemical Corporation Fellowship in the Department of Chemistry Fund | 2,450.87 | ..... | 2,149.00 | 301.87 |
| Motivation Studies in Paraplegia Fund | 2,975.17 | ..... | 2,975.17 | ..... |
| Music Department Record Collection Fund | 208.50 | 74.90 | 179.91 | 103.49 |
| National Cystic Fibrosis Foundation: | | | | |
| Grant-1963 | 1,519.73 | 18,495.50 | 20,015.23 | ..... |
| Grant-1964 | ..... | 5,000.00 | 8,682.97 | 3,682.97* |
| Grant to Dr. Dees | 6,967.04 | ..... | 6,967.04 | ..... |
| National Foundation Grant: | | | | |
| Grant CPERT 128 | 16,089.28 | ..... | 16,089.28 | ..... |
| Grant CPERT 128 | ..... | 4,834.44 | 4,834.44 | ..... |
| National Fund for Medical Education | 5,081.20 | 271.28 | 2,380.84 | 2,971.64 |
| National Fund for Medical Education Special Purpose Grant | 4,000.00 | ..... | 2,686.08 | 1,313.92 |
| National Neurological Foundation Fellowship to Dr. D. C. Tosteson | 62.50* | 12,000.00 | 12,162.97 | 225.47* |
| National Plant Food Institute Grant to Dr. F. W. Woods | 14.68 | ..... | ..... | 14.68 |
| National Science Foundation: | | | | |
| Grant G-23126 | 12,420.00 | ..... | 9,124.76 | 3,295.24 |
| Grant G-23533 | 3,825.00 | ..... | 1,539.06 | 2,285.94 |
| Grant G-23724 | 7,500.00 | 8,192.84 | 15,692.84 | ..... |
| Grant GE-1379 | ..... | 5,380.00 | ,,697.10 | 3,682.90 |
| Grant GE-2117 | ..... | 11,420.00 | 4,653.83 | 6,766.17 |
| Graduate Fellowship Program Grant | ..... | 13,820.00 | 1,019.84 | 12,800.16 |
| Institutional Grant G-18238 | 1,022.90 | 32,415.00 | 18,358.67 | 15,079.23 |
| National Shade Tree Conference Fellowship | 205.92 | 3,000.00 | 2,829.33 | 376.59 |
| National Tuberculosis Association: | | | | |
| Grant R & S 7A-6 | ..... | 7,073.00 | 4,882.33 | 2,190.67 |
| Grant R & S 7A-31 | ..... | 7,813.00 | 6,730.92 | 1,082.08 |
| Vitamin Research Fund | 159.00 | ..... | 159.00 | ..... |
| Neurosurgical Research Fund | 2,636.56 | ..... | 539.27 | 2,097.29 |
| Newman, Georgia Heart Research Fund | 266.30 | ..... | ..... | 266.30 |
| Newspaper Education Workshop Fund | 56.84 | ..... | ..... | 56.84 |
| N. C. Board of Health Community Health Training Program Grant | ..... | 8,500.00 | 5,857.24 | 2,642.76 |
| North Carolina Conference Higher Education Fund | 518.45 | ..... | ..... | 518.45 |
| North Carolina Heart Association: | | | | |
| Grant to Dr. W. F. Barry, Jr. | 2,000.00 | ..... | 2,074.39 | 74.39* |
| Grant to Dr. I. W. Brown, Jr. | 3,920.00 | ..... | 3,747.33 | 172.67 |
| Grant to Dr. I. W. Brown, Jr. | ..... | 2,000.00 | ..... | 2,000.00 |
| Grant to Dr. R. Canent, Jr. | ..... | 1,950.00 | 1,162.00 | 788.00 |
| Grant to Dr. E. H. Estes | 292.18 | ..... | 279.88 | 12.30 |
| Grant to Dr. W. L. Floyd | 1,104.59 | 1,062.87 | 383.64 | 1,783.82 |
| Grant to Dr. W. L. Floyd | ..... | 1,000.00 | ..... | 1,000.00 |
| Grant to Dr. Joseph C. Greenfield | ..... | 2,000.00 | 816.77 | 1,183.23 |
| Grant to Dr. J. Coulie Gunnells | ..... | 2,000.00 | 404.30 | 1,595.70 |
| Grant to Dr. F. G. Hall | 54.00 | ..... | 54.00 | ..... |
| Grant to Dr. K. D. Hall | 2,000.00 | ..... | 811.55 | 1,188.45 |
| Grant to Dr. Leonard Hart | ..... | 1,000.00 | 1,044.26 | 44.26* |
| Grant to Dr. A. Heyman | 62.54* | 62.54 | ..... | ..... |
| Grant to Dr. A. Heyman | 1,845.06 | ..... | 1,763.64 | 81.42 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant to Dr. A Heyman | ..... | 1,200.00 | 296.10 | 903.90 |
| Grant to Dr. G. H. Ira, Jr. | 233.36 | 25.34 | 228.70 | 30.00 |
| Grant to Dr. Henry Kamin | 264.80 | ..... | 35.10 | 229.70 |
| Grant to Dr. Norman Kirshner | 841.34 | ..... | 20.00 | 821.34 |
| Grant to Dr. J. E. Markee | 1,322.85* | 1,322.85 | ..... | ..... |
| Grant to Dr. F. Maxton Mauney | ..... | 2,000.00 | ..... | 2,000.00 |
| Grant to Dr. Benjamin McCall | ..... | 2,000.00 | 1,350.17 | 649.83 |
| Grant to Dr. Hiroshi Nagaya | ..... | 1,950.00 | 50.00 | 1,900.00 |
| Grant to Dr. Ernest Peschel | 1,916.60 | ..... | ..... | 1,916.60 |
| Grant to Dr. Roscoe R. Robinson | ..... | 12,000.00 | 11,967.28 | 32.72 |
| Grant to Dr. J. L. Rosenberg | 483.04 | 101.77 | 584.81 | ..... |
| Grant to Dr. H. A. Saltzman | 2,723.53 | ..... | 3,050.00 | 326.47* |
| Grant to Dr. Hubert Saltzman | ..... | 2,000.00 | ..... | 2,000.00 |
| Grant to Dr. H. O. Sieker | 2,000.00 | ..... | 495.34 | 1,504.66 |
| Grant to Dr. J. C. Sleeper | 448.44 | 111.79 | 560.23 | ..... |
| Grant to Dr. W. W. Smith | 2,000.00 | ..... | ..... | 2,000.00 |
| Grant to Dr. M. S. Spach | 870.52 | ..... | 824.19 | 46.33 |
| Grant to Dr. Howard K. Thompson | ..... | 1,956.00 | ..... | 1,956.00 |
| Grant to Dr. D. I. Weinberg | 1,967.61 | ..... | 1,967.61 | ..... |
| Grant to Dr. R. E. Whalen | 7.78 | ..... | 7.78 | ..... |
| Grant to Dr. R. E. Whalen | ..... | 2,000.00 | ..... | 2,000.00 |
| Grant to Dr. Benjamin Wittels | 1,881.40 | ..... | 1,844.91 | 36.49 |
| North Carolina Kidney Disease Foundation Grant to Dr. W. D. Forbus | 198.76 | ..... | 198.76 | ..... |
| North Carolina Land Ownership Study Fund | 102.05 | 300.00 | 122.10 | 279.95 |
| Nurse Anesthesia Fund | 611.02 | ..... | 238.03 | 372.99 |
| Nutrition Foundation Fellowship Fund | 1,800.00 | ..... | 1,800.00 | ..... |
| Obstetrics and Gynecology: | | | | |
| Bacteriologic Research Fund | 14,860.89 | 891.93 | ..... | 15,752.82 |
| Departmental Fund | ..... | 81,698.33 | ..... | 81,698.33 |
| Office of Institutional Advancement Fund | 7,017.26 | 45,000.00 | 39,852.85 | 12,164.41 |
| Office of Ordnance Research Building Reserve Fund | 25,183.03 | 7,911.36 | ..... | 33,094.39 |
| Operating Room Fund | 7,887.39* | 75,000.00 | 64,684.12 | 2,428.49 |
| Ophthalmology Department Fund | 13,604.48 | 18,702.69 | 18,745.72 | 13,561.45 |
| Ophthalmology Research Fund | 152.47 | ..... | 134.37 | 18.10 |
| Otolaryngology Fund | 5,742.95* | 6,642.74 | 482.17 | 417.62 |
| Parke, Davis and Co. Research Grant for Dr. Phillip Handler | 2,174.49 | ..... | 120.45 | 2,054.04 |
| Dr. Roy T. Parker Research Fund | ..... | 8,820.00 | 25.86 | 8,794.14 |
| Pathology Department Fund | 1,389.32 | 2,674.10 | 2,340.81 | 1,722.61 |
| Peace Research Institute Papers Fund | 4,777.83 | ..... | 4,378.00 | 399.83 |
| Pediatric Department Fund | 55,877.92 | 85,853.74 | 42,648.06 | 99,083.60 |
| Pediatric Endocrinological Research Fund | 1,067.53 | ..... | 658.36 | 409.17 |
| Pediatric House Staff Medical Library Fund | 1,500.00 | ..... | ..... | 1,500.00 |
| T. L. Perkins Fund | 28,489.60 | 826.38 | ..... | 29,315.98 |
| Philip Morris Research Assistant in Chemistry Fund | 557.91 | 5,000.00 | 4,682.91 | 875.00 |
| Physical Plant Betterment Fund | 538,789.37 | 200,566.32 | 66,258.46 | 673,097.23 |
| Physical Therapy Fund | ..... | 690.50 | ..... | 690.50 |
| Physics Department Supplementary AEC Contract | 152,757.20 | 69,184.87 | ..... | 221,942.07 |
| Plastic and Oral Surgery Fund | 4,346.01 | 468.00 | 15.75 | 4,798.26 |
| Plastic Surgery Residents' Fund | 324.64 | ..... | ..... | 324.64 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Plough, Inc. Grant for Pediatric Study | 4,713.28 | ..... | ..... | 4,713.28 |
| Pre-Fab Apartments Reserve Fund | 20,372.01 | 265.39 | ..... | 20,637.40 |
| R. C. Price International Peace Studies Fund | 25,505.21 | 26,123.79 | 25,932.49 | 25,696.51 |
| Propaganda Project Fund | 2,661.40 | ..... | 147.52 | 2,513.88 |
| Provost's Fund | 97,416.67 | 33,000.00 | 79,512.49 | 50,904.18 |
| Psychiatric Research Fund | 229,704.36 | 189,785.71 | 105,292.13 | 314,197.94 |
| Psychobiological Research Fund | 26,564.81 | 490.09 | 2,937.95 | 24,116.95 |
| Psychology Clinical Training Fund | 300.00 | ..... | ..... | 300.00 |
| Psychology Department Equipment Fund | ..... | 22,860.00 | ..... | 22,860.00 |
| Psychology Research Fellowship Fund | 13,889.13 | 6,598.12 | 6,500.14 | 13,987.11 |
| Purdue Frederick Co., Drug Research Fund | .. | 2,000.00 | 252.99 | 1,747.01 |
| Radioisotope Laboratory Research Fund | 93.33 | ..... | 93.33 | ..... |
| Radiological Society Fund | 1,347.16 | 102.25 | 458.81 | 990.60 |
| James H. Rand Research Fund | 5,000.00 | ..... | ..... | 5,000.00 |
| Russell Ranson's Engineering Fund | 5,600.00 | ..... | 500.00 | 5,100.00 |
| Rehabilitation Account Fund | 1,024.05 | 154.20 | 154.20 | 1,024.05 |
| Research Publication Fund | 10,466.52 | 6,334.61 | 3,990.00 | 12,811.13 |
| Resources for the Future, Inc.: | | | | |
| Forestry Fund | 4,712.51 | ..... | 2,979.25 | 1,733.26 |
| Grant to Dr. H. H. Winsborough | ..... | 8,086.85 | 1,202.11 | 6,884.74 |
| Research Equipment Fund for Dr. R. J. Menzies | ..... | 6,489.00 | ..... | 6,489.00 |
| Retail Stores Betterment Fund | 84,614.08 | 23,920.59 | 40,574.96 | 67,959.71 |
| Anita Ritter Memorial Fund | 23,552.90 | 517.50 | 153.50 | 23,916.90 |
| Rockefeller Foundation: | | | | |
| Grant to Dr. J. G. Colton | 1,001.94 | ..... | 1,001.94 | ..... |
| Grant GA-HUM-60100 | 1,843.97 | ..... | 289.00 | 1,554.97 |
| Grant GA-SS-6013 | 8,000.00 | ..... | ..... | 8,000.00 |
| Grant RF-61026 | 35,769.03 | 5,200.00 | 37,271.12 | 3,697.91 |
| Grant RF-61153 #16 | ..... | 9,984.16 | 7,044.58 | 2,939.58 |
| Grant RF-61171 #14 | ..... | 4,250.00 | 3,663.78 | 586.22 |
| Grant RF-61171 #16 | ..... | 4,400.00 | 4,400.00 | ..... |
| Grant for Master of Science Program | 3,899.66 | 33,663.46 | 29,019.33 | 8,543.79 |
| A. H. Robins Co., Inc. Research Grant to Dr. C. R. Stephen | ..... | 8,320.00 | 3,438.29 | 4,881.71 |
| Damon Runyon Research on Effects of Smoke Aerosols Fund | 198.53 | 5.71 | 204.24 | ..... |
| Rural Church Clinic Fund | 1,622.00* | 2,530.64 | 908.64 | ..... |
| Sealantic Fund | 2,297.74* | 7,500.00 | 5,859.23 | 656.97* |
| G. D. Searle and Company: | | | | |
| Research of Dr. G. J. Baylin Fund | 67.80 | ..... | 84.21 | 16.41* |
| Synthetic Drugs Research Fund | 9,204.40 | 223.44 | 5,455.54 | 3,972.30 |
| Robert E. Seibels, Jr. Memorial Laboratory Fund | 3,182.81 | 1,414.38 | 150.55 | 4,446.64 |
| School of Forestry Equipment Fund | ..... | 6,202.00 | ..... | 6,202.00 |
| Shell Companies Foundation Inc.: | | | | |
| Fellowship in Engineering Fund | ..... | 3,275.00 | 3,469.64 | 194.64* |
| Fellowship in Physics Fund | 2,879.58 | ..... | 2,879.58 | ..... |
| Fundamental Research Grant in Physics | 5,894.64 | 5,000.00 | 5,246.79 | 5,647.85 |
| W. W. Shingleton Research Fund | 3,799.69 | 18,215.06 | 20,536.99 | 1,477.76 |
| Larry Silver Leukemia Foundation Grant to Dr. Doris A. Howell | ..... | 500.00 | 500.00 | ..... |
| Alfred P. Sloan Foundation: | | | | |
| Equipment Grant BR-320 | 1,210.79 | ..... | 1,210.79 | ..... |
| Fellowship Grant BR-319 | 9,458.06 | ..... | 9,458.06 | ..... |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Grant BR-479 | 5,375.00 | 15,708.06 | 6,463.16 | 14,619.90 |
| Grant BR-480 | 700.00 | 1,013.35 | 1,440.38 | 272.97 |
| Grant to Dr. J. C. Poirier | 15,968.51 | | 7,774.58 | 8,193.93 |
| Smith, Kline and French: | | | | |
| Grant to Dr. J. L. Callaway | 370.03 | | 125.56 | 244.47 |
| Grant to Dr. F. L. Engel | 13.42 | | 13.42 | |
| J. Graham Smith Research Fund | 1,891.18 | 3,000.00 | 1,464.40 | 3,426.78 |
| Lilly Webb Smith Fund for Underprivileged Children | 358.85 | | | 358.85 |
| Socio-Economic Studies of Aging Symposium | | 1,000.00 | | 1,000.00 |
| Sororities Facilities Fund | | 409.00 | | 409.00 |
| Southeastern Jurisdictional Fund for Ministerial Education | 33,934.72 | 50,397.95 | | 84,332.67 |
| Southern Forest Disease & Insect Research Council Fund | 2,211.08 | 2,400.00 | 2,365.23 | 2,245.85 |
| Southern Pulpwood Conservation Association Research Fund | | 5,000.00 | 1,330.85 | 3,669.15 |
| Special Endocrine Fund | 9,592.75 | 12,891.92 | 10,911.70 | 11,572.97 |
| Special Gifts for Library Books Fund | 16,991.24 | 22,862.57 | 19,015.51 | 20,838.30 |
| Spinal Cord Injury Exhibit Fund | 847.02 | | 847.02 | |
| E. R. Squibb and Sons Grant to Drs. E. E. Owen and M. P. Tyor | 1,770.40 | | 733.73 | 1,036.67 |
| Strasburger Research Fund | 212.74 | | 222.07 | 9.33* |
| Student Project Fund | 682.22 | | | 682.22 |
| Summer Institute for English Teachers | | 3,100.00 | 3,871.57 | 771.57* |
| Surgical Clinical Research Laboratory Fund | 12,142.97 | 327.22 | 4,811.87 | 7,658.32 |
| Surgical Research Fund | 82,007.82 | 2,795.58 | 3,850.85 | 80,952.55 |
| Surgical Shop Fund | 26,847.81 | 10,797.84 | | 37,645.65 |
| Taylor Foundation Orthopedic Fund | 5,036.00 | | | 5,036.00 |
| Tennessee Eastman Corporation Fellowship Fund | 1,000.04 | | 1,000.04 | |
| James A. Thomas Memorial Fund | 4,723.62 | | 7,787.15 | 3,063.53* |
| Thoracic Research Fund | 10,282.13 | 10.00 | 10.00 | 10,282.13 |
| Thoracic Surgery Fund | 2,223.72 | 5,525.00 | 3,888.06 | 3,860.66 |
| Tobacco Chemistry Research Program Fund | 7,458.68 | 5,000.00 | 7,914.31 | 4,544.37 |
| Tobacco Industry Research Committee Fellowship Fund | 388.87 | 600.00 | 588.89 | 399.98 |
| Tobacco Research Fund | 799.79 | | 225.00 | 574.79 |
| Trent Lecture Fund | | 250.00 | 250.00 | |
| Undergraduate Science Education Equipment Fund | | 8,600.00 | 248.30 | 8,351.70 |
| Union Carbide and Carbon Corporation Fellowship in Organic Chemistry Fund | 2,398.75 | 4,075.00 | 5,462.19 | 1,011.56 |
| United Health & Medical Research Foundation of South Carolina | 1,521.55 | | 1,714.11 | 192.56* |
| United Medical Research Foundation of North Carolina Fund | 31,816.67 | 46,580.21 | 49,653.58 | 28,743.30 |
| United States Steel Foundation, Inc. Fund | 20,000.00 | 20,000.00 | | 40,000.00 |
| United States Steel Foundation, Inc. Graduate Fellowship in Physics | .06 | 5,475.00 | 2,877.48 | 2,597.58 |
| Upjohn Company Research Fund | | 7,900.00 | 629.61 | 7,270.39 |
| Urological Research Fund | 16,128.86 | 988.65 | 5,021.74 | 12,095.77 |

*Indicates Deficit.

## Schedule E (Continued)—Current Restricted Funds

| *Name of Fund* | *Balance July 1, 1962* | *Received* | *Disbursed* | *Balance June 30, 1963* |
|---|---|---|---|---|
| Vitamix, Inc. Grant to Dr. H. D. McIntosh | ..... | 1,500.00 | 653.99 | 846.01 |
| Weltman Laboratory Account | 2,998.36 | 4,040.26 | 1,542.43 | 5,496.19 |
| West Virginia Experimental Forest Library Research Fund | 112.17 | ..... | 41.60 | 70.57 |
| Western Electric Employees Summer Course Fund | 8,964.28 | ..... | 6,991.93 | 1,972.35 |
| Woodrow Wilson: | | | | |
| Fellowship Fund | 6,617.20 | 10,500.00 | 9,450.00 | 7,667.20 |
| Graduate School Fund | 12,289.19 | 3,500.00 | 5,113.50 | 10,675.69 |
| Woman's College: | | | | |
| Student Aid Fund | 1,250.00 | 95.00 | 125.00 | 1,220.00 |
| Student Project Fund | 25.00 | ..... | ..... | 25.00 |
| World Rule of Law Discretionary Fund | 50.00 | ..... | 10.00 | 40.00 |
| Wyeth Laboratories Allergy Fund | 2,722.17 | 16,103.00 | 14,494.26 | 4,330.91 |
| X-Ray Department Fund | 19,243.84 | 26,389.12 | 20,634.87 | 24,998.09 |
| York Chapel Fund | 3,057.60 | ..... | 129.96 | 2,927.64 |
| Glenn Young Research Fund | 3,841.84 | ..... | 813.42 | 3,028.42 |
| Total Non-Governmental | $6,458,813.96 | $ 4,084,144.05 | $ 3,666,700.74 | $6,876,257.27 |
| Grand Total | $8,261,724.83 | $13,448,356.74 | $13,665,452.95 | $8,044,628.62 |

*Indicates Deficit.

# SCHEDULE F—GIFTS, GRANTS AND CONTRACTS FOR RESEARCH

| | | |
|---|---|---|
| **INDIVIDUALS:** | | |
| Mrs. H. C. Barbee | | $ 585.00 |
| Cancer Research Account | | 17,600.00 |
| Department of Surgery Fund | | 506.05 |
| F. M. Hanes Bequest to Department of Medicine | | 67,644.58 |
| F. M. Hanes Bequest to School of Medicine | | 67,644.57 |
| F. M. Hanes Memorial Trust Fund | | 4,428.40 |
| H. H. Hatcher | | 600.00 |
| Hematology Research Fund | | 2,192.94 |
| Maida Jenkins | | 670.00 |
| Johnny Klein Heart Research Fund | | |
| Fred W. Klein | $ 1,250.00 | |
| 8 other contributors | 546.29 | 1,796.29 |
| William McDougall Research Fund: | | |
| Chester Carlson | 15,135.41 | |
| Estate of E. M. Dickerman | 1,445.49 | |
| Dr. Marie Higbee | 750.00 | |
| 4 other contributors | 729.71 | 18,060.61 |
| Earl D. Osborn | | 2,500.00 |
| Ralph C. Price | | 24,000.00 |
| Mrs. James Self, Sr. | | 10,000.00 |
| Urological Research Fund | | 957.00 |
| Paula von Klein | | 500.00 |
| 8 other contributors | | 907.50 |
| | | 220,592.94 |
| **INDUSTRY:** | | |
| Abbott Laboratories | 9,500.00 | |
| American Tobacco Company | 5,000.00 | |
| Anonymous | 10,000.00 | |
| Ayerst Laboratories | 6,600.00 | |
| Ciba Pharmaceutical Products | 2,500.00 | |
| E. I. DuPont de Nemours & Company | 6,000.00 | |
| Ethicon, Inc. | 1,800.00 | |
| Geigy Chemical Corp. | 12,500.00 | |
| General Electric Company | 10,000.00 | |
| Johnson & Johnson | 2,225.00 | |
| Mead Johnson Laboratories | 5,300.00 | |
| Lederle Laboratories | 2,500.00 | |
| Eli Lilly & Co. | 1,900.00 | |
| Merck & Co., Inc. | 10,000.00 | |
| Philip Morris, Inc. | 5,000.00 | |
| Procter & Gamble Company | 3,000.00 | |
| Purdue Fredrick Company | 2,000.00 | |
| A. H. Robins Company | 8,320.00 | |
| G. D. Searle & Company | 9,420.00 | |
| Smith, Kline & French Laboratories | 5,000.00 | |
| E. R. Squibb & Sons | 4,000.00 | |
| Tennessee Eastman Company | 6,000.00 | |
| Upjohn Company | 10,500.00 | |
| Vitamix, Inc. | 1,500.00 | |
| Westwood Pharmaceuticals | 1,000.00 | |
| Wyeth Laboratories | 16,103.00 | 157,668.00 |
| **FOUNDATIONS:** | | |
| American Cancer Society | 139,980.84 | |
| American Chemical Society | 6,600.00 | |

## Schedule F (Continued)—Gifts, Grants and Contracts for Research

| | | |
|---|---|---|
| American Heart Association | 12,878.79 | |
| American Society of International Law | 3,250.00 | |
| Mary Reynolds Babcock Foundation | 25,000.00 | |
| Mary Duke Biddle Foundation | 25,065.00 | |
| The Carnegie Foundation | 60,000.00 | |
| Chemstrand Research Center | 8,200.00 | |
| Compton Trust | 13,000.00 | |
| Camille & Henry Dreyfus Foundation | 5,000.00 | |
| Esso Education Foundation | 3,000.00 | |
| The Ford Foundation | 114,981.97 | |
| Herman Frasch Foundation | 10,000.00 | |
| Walter Kempner Foundation | 15,000.00 | |
| Life Insurance Medical Research Fund | 42,075.00 | |
| Lilly Endowment | 25,000.00 | |
| Methodist Church Board of Education | 1,500.00 | |
| National Cystic Fibrosis Foundation | 18,350.00 | |
| The National Foundation | 1,087.64* | |
| National Tuberculosis Association | 14,872.33 | |
| North Carolina Heart Association | 35,056.00 | |
| Peace Research Institute | 2,000.00* | |
| Stanley F. Raczynsk Foundation | 5,000.00 | |
| Resources for the Future, Inc. | 8,086.85 | |
| Rockefeller Foundation | 13,850.00 | |
| Shell Companies Foundation | 5,000.00 | |
| Larry Silver Leukemia Foundation | 500.00 | |
| Southern Pulpwood Association | 7,400.00 | |
| United Medical Research Foundation | 26,000.00 | |
| 2 other contributors | 550.00 | 642,109.14 |
| GOVERNMENT: | | |
| Atomic Energy Commission | 483,313.26 | |
| National Aeronautics and Space Agency | 46,923.00 | |
| National Science Foundation | 464,348.87 | |
| Small Business Administration | 3,000.00 | |
| United States Air Force | 184,865.30 | |
| United States Army | 1,059,488.18 | |
| United States Department of Agriculture | 1,193.80 | |
| United States Fish and Wildlife Service | 27,054.45 | |
| United States Navy | 100,794.56 | |
| United States Office of Vocational Rehabilitation | 79,688.24 | |
| United States Public Health Service | 4,217,845.42 | 6,668,515.08 |
| | | $7,688,885.16 |

*Indicates Deficit.

## SCHEDULE G—GRANTS AND CONTRACTS FOR TRAINING PROGRAMS

| | | |
|---|---|---|
| American Cyanamid Company | | $ 3,500.00 |
| Approved Supply Pastors School: | | |
| North Carolina Conference | $ 2,500.00 | |
| Southeastern Jurisdictional Conference | 7,193.98 | |
| Virginia Conference | 2,362.50 | |
| West Virginia Conference | 3,400.00 | |
| Western North Carolina Conference | 3,300.00 | |
| 3 other contributors | 613.00 | 19,369.48 |
| Bell Telephone Laboratories | | 7,312.50 |
| Mary Duke Biddle Foundation | | 2,000.00 |
| Commonwealth Fund | | 120,000.00 |
| The Ford Foundation | | 4,513.14* |
| James A. Gray Trust | | 12,645.62 |
| The National Foundation | | 4,834.44* |
| National Science Foundation | | 45,514.86 |
| North Carolina State Board of Health | | 20,769.88 |
| Rockefeller Foundation | | 33,663.46 |
| United States Air Force | | 2,434.07 |
| United States Navy | | 2,290.53 |
| United States Office of Vocational Rehabilitation | | 21,000.00 |
| United States Public Health Service | | 1,473,000.65 |
| | | $1,754,153.47 |

## SCHEDULE H—GIFTS FOR THE LIBRARIES

| | |
|---|---|
| American Association of Theological Schools | $ 6,000.00 |
| Associates of the Trent Collection | 1,188.00 |
| Mary Duke Biddle Foundation | 17,787.64 |
| Friends of the Duke University Library | 2,648.92 |
| 3 other contributors | 336.02 |
| | $ 27,960.58 |

## SCHEDULE I—GIFTS FOR CURRENT EXPENSES

| | | |
|---|---|---|
| American Medical Education Foundation | | $ 5,260.32 |
| The Duke Endowment | | 100,000.00 |
| Gifts from Industry: | | |
| The Alcoa Foundation | $ 500.00 | |
| Allis-Chalmers Foundation, Inc. | 600.00 | |
| American Oil Foundation | 15,000.00 | |
| Bell Telephone Laboratories | 7,312.50 | |
| Burlington Industries Foundation | 1,000.00 | |
| Champion Paper Foundation | 500.00 | |
| Chase Manhattan Bank Foundation | 10,000.00 | |
| Connecticut General Life Ins. Co. | 640.00 | |
| Continental Oil Company | 500.00 | |
| Eastman Kodak Company | 4,200.00 | |
| Esso Education Foundation | 5,000.00 | |
| Equitable Life Assurance Society | 1,000.00 | |

*Indicates Deficit.

## Schedule I (Continued)—Gifts for Current Expenses

| | | |
|---|---|---|
| First National City Bank Foundation | 1,360.00 | |
| Ford Motor Company | 1,500.00 | |
| General Motors Corporation | 6,400.00 | |
| Gulf Oil Corporation Foundation | 1,416.00 | |
| Household Finance Foundation | 600.00 | |
| The Johnson's Wax Fund, Inc. | 850.00 | |
| Merck & Company, Inc. | 500.00 | |
| Morgan Guaranty Trust Co. of New York | 800.00 | |
| National Merit Scholarship Corp. | 18,550.00 | |
| Philip Morris, Inc. | 1,000.00 | |
| R. J. Reynolds Tobacco Co. | 5,000.00 | |
| Roberts Dairy Company | 500.00 | |
| Sears Roebuck & Co. | 4,000.00 | |
| Shell Companies Foundation | 3,000.00 | |
| Texaco, Inc. | 1,500.00 | |
| Timken Roller Bearing Co. | 1,700.00 | |
| Travelers Insurance Co. | 805.00 | |
| Union Bag-Camp Paper Corp. | 1,100.00 | |
| U. S. Steel Foundation, Inc. | 525.00 | |
| Western Electric Fund | 600.00 | |
| Weyerhauser Company Foundation | 1,000.00 | |
| 3 other contributors | 800.00 | 99,758.50 |
| Dr. J. Deryl Hart | | 4,000.00 |
| Methodist Committee on World Service | | 94,500.00 |
| Methodist Conference Donations | | 44,334.01 |
| National Defense Fellowship Program | | 104,997.41 |
| National Fund for Medical Education | | 28,995.00 |
| National Society of Accountants for Cooperatives | | 3,639.06 |
| North Carolina Foundation of Church Related Colleges | | 516.30 |
| Rockefeller Foundation | | 2,500.00 |
| Southern Fellowships Fund | | 2,654.91 |
| One other contributor | | 457.50 |
| | | $491,613.01 |

## SCHEDULE J—GIFTS FOR FELLOWSHIPS AND SCHOLARSHIPS

| | | |
|---|---|---|
| American Cyanamid Company | | $ 1,200.00 |
| Anonymous | | 5,000.00 |
| Arthritis & Rheumatism Foundation | | 500.00 |
| The Asia Foundation | | 1,735.00 |
| Mary R. Babcock Foundation | | 2,800.00 |
| Mary Duke Biddle Foundation | | 3,000.00 |
| Brunswick Pulp & Paper Company | | 1,250.00 |
| The Commonwealth Fund | | 15,746.00 |
| Divinity School Foreign Student Scholarship Fund | | 570.00 |
| Divinity School Miscellaneous Scholarship Fund: | | |
| Fred W. Bradshaw | $ 1,200.00 | |
| Christian Education Foundation | 500.00 | |
| Brown Finch Foundation | 650.00 | |
| Florida Annual Conference | 1,000.00 | |
| Fund for Theological Education, Inc. | 700.00 | |
| Methodist Board of Education | 1,000.00 | |
| North Carolina Conference | 2,500.00 | |

## Schedule J (Continued)—Gifts for Fellowships and Scholarships

| | | |
|---|---|---|
| Ross Puette | 1,000.00 | |
| South Carolina Conference | 1,400.00 | |
| South Carolina Methodist Board of Education | 1,000.00 | |
| Western North Carolina Conference | 2,500.00 | |
| Mrs. Mary G. Yokley | 500.00 | |
| 15 other contributors | 3,595.00 | 17,545.00 |
| Angier B. Duke Memorial, Inc. | | 140,000.00 |
| J. B. Duke 100th Anniversary Fund | | 20,845.59 |
| Duke University Sundry Scholarships: | | |
| Chemstrand Corp. | 1,000.00 | |
| The Alcoa Foundation | 625.00 | |
| Burlington Industries Foundation | 1,000.00 | |
| Duke Hospital Women's Auxiliary | 600.00 | |
| General Motors Corp. | 8,400.00 | |
| Haskins & Sells Foundation | 500.00 | |
| Miriam Makeba | 1,500.00 | |
| Manoocherian-Robbins Foundation | 500.00 | |
| Peat, Marwick, Mitchell & Co. | 800.00 | |
| Price Waterhouse Foundation | 800.00 | |
| Procter & Gamble Co. | 7,000.00 | |
| Rayonier, Inc. | 500.00 | |
| Texaco, Inc. | 3,000.00 | |
| Union Bag-Camp Paper Corp. | 1,200.00 | |
| 3 other contributors | 702.38 | 28,127.38 |
| E. I. DuPont de Nemours & Co. | | 5,320.00 |
| The Ford Foundation | | 5,751.72 |
| General University Scholarships: | | |
| Duke University Athletic Association | 38,000.00 | |
| Bruce A. Dean | 500.00 | |
| Thomas Austin Finch Foundation | 2,000.00 | |
| A. E. Finley Foundation, Inc. | 600.00 | |
| J. Welch Harriss | 500.00 | |
| Joseph S. Hiatt, Jr. | 600.00 | |
| A. F. Hooker | 500.00 | |
| B. Everett Jordan | 500.00 | |
| Pepsi Cola Bottling Co. | 500.00 | |
| Royal Cotton Mill Co. | 500.00 | |
| J. Raymond Smith | 500.00 | |
| Earle W. Webb | 500.00 | |
| 111 other contributors | 14,884.18 | 60,084.18 |
| Harvard University | | 1,065.10 |
| International Shade Tree Association | | 3,000.00 |
| Walter Kempner | | 6,598.12 |
| Koppers Foundation | | 1,600.00 |
| Thayer Lindsley | | 1,000.00 |
| Medical School Scholarship Fund: | | |
| Manoocherian-Robbins Foundation | 500.00 | |
| Charles Pfizer & Co. | 1,000.00 | |
| Mary D. B. T. Semans | 1,200.00 | |
| Dr. James H. Semans | 1,200.00 | |
| 46 other contributors | 12,192.92 | 16,092.92 |
| National Aeronautics and Space Agency | | 59,000.00 |
| National Neurological Foundation | | 12,000.00 |
| National Science Foundation | | 51,646.20 |
| Rockefeller Foundation | | 9,984.16 |

## Schedule J (Continued)—Gifts for Fellowships and Scholarships

| | |
|---|---|
| Shell Companies Foundation | 3,275.00 |
| Alfred P. Sloan Foundation | 6,250.00 |
| Tobacco Industries Research Fellowship | 600.00 |
| Union Carbide Chemical Co. | 4,075.00 |
| United States Fish & Wildlife Service | 15,755.00 |
| United States Public Health Service | 91,011.70 |
| United States Steel Foundation | 5,475.00 |
| Woodrow Wilson National Fellowship Fund | 14,000.00 |
| 4 other contributors | 1,125.00 |
| | $ 613,028.07 |

## SCHEDULE K—GIFTS FOR MISCELLANEOUS PURPOSES

| | |
|---|---|
| American Cyanamid Company | $ 24,000.00 |
| Ayerst Laboratories | 1,125.31 |
| Mary Duke Biddle Foundation | 42,012.36 |
| The Borden Company Foundation | 2,500.00 |
| Carnegie Corp. of N. Y. | 13,000.00 |
| Chi-Psi Education Trust | 1,500.00 |
| Doris Duke Foundation | 31,450.14 |
| The Duke Endowment | 275,364.00 |
| E. I. DuPont de Nemours & Co. | 4,000.00 |
| Indiana University | 1,000.00 |
| Institute for International Order | 3,000.00 |
| Johnson Foundation | 9,100.00 |
| W. K. Kellogg Foundation | 30,000.00 |
| Walter Kempner | 5,600.00 |
| Methodist Conferences | 9,900.00 |
| National Science Foundation | 1,566.94 |
| Summer Institute for English Teachers | 3,100.00 |
| United States Air Force | 4,575.00 |
| 22 other contributors | 2,079.08 |
| | $ 464,872.83 |

## SCHEDULE L—GIFTS FOR PLANT AND EQUIPMENT

| | |
|---|---|
| Adelaide B. Arrington | $ 500.00 |
| Atomic Energy Commission | 17,098.00 |
| Mary Duke Biddle Foundation | 95,355.00 |
| Fred W. Bradshaw | 1,000.00 |
| The Duke Endowment | 1,350,468.00 |
| The Duke Endowment—Hospital Section | 734,000.00 |
| Duke Hospital Chapel Fund | 717.10 |
| Mrs. R. Greenlee | 14,750.00 |
| Dr. L. B. Holt | 500.00 |
| National Science Foundation | 38,110.37 |
| North Carolina Medical Care Commission | 261,477.30 |
| Southeastern Jurisdictional Conference | 48,018.19 |
| R. E. Thigpen | 1,088.68 |
| United States Public Health Service | 569,319.00 |
| United States Steel Foundation | 20,000.00 |

## Schedule L (Continued)—Gifts for Plant and Equipment

| | |
|---|---|
| Western North Carolina Conference | 16,655.00 |
| Woman's College Class of 1963 | 750.00 |
| 37 other contributors | 1,108.10 |
| | $3,170,914.74 |

## SCHEDULE M—GIFTS AND BEQUESTS TO PERMANENT FUNDS

| | | |
|---|---|---|
| For Endowment Funds: | | |
| Estate of Joseph Cohan | $ 8,128.00 | |
| Estate of John Allen Morgan | 1,850.00 | |
| Estate of Word H. Wood | 151,271.31 | $ 161,249.31 |
| For Endowed Special Funds: | | |
| Charles C. Beneke | 1,224.62 | |
| B. C. Remedy Company | 2,000.00 | |
| Duke Chapter Pi Tau Sigma | 500.00 | |
| William F. Franck, Jr. | 2,197.25 | |
| Dr. M. T. Frizzelle | 1,500.00 | |
| Estate of John P. Gibbons | 183,150.00 | |
| Mr. & Mrs. Edwin L. Jones, Jr. | 1,000.00 | |
| Nellie McClees | 500.00 | |
| Poplar Realty Company | 1,000.00 | |
| Hersey E. and Bessie W. Spence | 29,813.36 | |
| 4 other contributors | 95.00 | 222,980.23 |
| For Scholarship Funds: | | |
| Elizabeth C. Blackburn | 500.00 | |
| Estate of Celeste W. Blake | 106,429.74 | |
| Estate of Kenneth M. Blake | 40,233.86 | |
| Broyhill Education Fund | 500.00 | |
| James T. Cleland | 6,000.00 | |
| H. B. Fowler | 500.00 | |
| Amos R. Kearns | 1,000.00 | |
| Mrs. Kate R. Kearns | 1,000.00 | |
| Richard C. Leach Foundation | 500.00 | |
| Mrs. Beatrice Kerner Reavis | 4,850.00 | |
| Warren C. Stack | 600.00 | |
| B. S. Womble | 1,222.02 | |
| 162 other contributors | 10,208.21 | 173,543.83 |
| For Loan Funds: | | |
| Aloe Charitable Trust | 6,000.00 | |
| Albert Anderson Trust | 1,970.24 | |
| W. K. Kellogg Foundation | 10,000.00 | |
| Merck Company Foundation | 3,000.00 | |
| Salisbury Community Foundation | 1,200.00 | |
| Wylma C. Woolard | 1,000.00 | |
| 2 other contributors | 290.00 | 23,460.24 |
| | | $ 581,233.61 |

## Schedule N—Gifts for Professorships

| | |
|---|---|
| Mary Duke Biddle Foundation | $ 78,500.00 |
| The Duke Endowment | 60,000.00 |
| | $ 138,500.00 |

# DUKE UNIVERSITY INVESTMENTS

## Fiscal year ended June 30, 1963

| *Bonds Par Value* | *U. S. Treasury* |
|---|---|
| 260M | Bills 7/5/63 |
| 89M | 3⅛% Ctfs. 11/15/63 |
| 14M | 4⅞% Notes 11/15/63 |
| 50M | 3% Bonds 2/15/64 |
| 2,500M | 3¾% Notes 5/15/64 |
| 99M | 3¼% Ctfs. 5/15/64 |
| 123M | 4¾% Notes 5/15/64 |
| 1,390M | 3¾% Notes 8/15/64 |
| 700M | 3⅝% Notes 2/15/66 |
| 1,855M | 3¾% Bonds 5/15/66 |
| 3,040M | 4% Notes 8/15/66 |
| 25M | 4% Bonds 10/1/69 |
| 1M | 2½% Bonds 12/15/69 |
| 235M | 4% Bonds 2/15/72 |
| 999.5M | 3% Bonds 2/15/95 |
| 2M | Series G Bonds 1964 |
| | *U. S. Government Instrumentalities* |
| 405M | Federal Home Loan Bank 3¼% Bonds 7/16/63 |
| 1,390M | Federal Home Loan Bank 3.20% Notes 1/15/64 |
| 145M | Federal Home Loan Bank 3½% Bonds 10/15/64 |
| 180M | Federal Land Banks 4¼% Bonds 7/20/66 |
| 130M | Federal Land Banks 4¼% Bonds 3/20/68 |
| 200M | Federal Land Banks 4⅜% Bonds 3/20/69 |
| 50M | Federal Land Banks 3½% Bonds 5/1/71 |
| 100M | Federal Land Banks 4½% Bonds 2/20/74 |
| 545M | Federal Intermediate Credit Banks 3.20% Deb. 7/1/63 |
| 1,000M | Federal Intermediate Credit Banks 3.1% Deb. 8/1/63 |
| 1,650M | Federal Intermediate Credit Banks 3.15% Deb. 9/3/63 |
| 1,285M | Federal Intermediate Credit Banks 3.15% Deb. 10/1/63 |
| 1,100M | Federal National Mortgage Association 3⅝% Deb. 5/11/64 |
| 25M | Federal National Mortgage Association 3¼% Deb. 12/11/64 |
| 120M | Federal National Mortgage Association 3⅝% Deb. 3/11/68 |
| 300M | Federal National Mortgage Association 4⅛% Deb. 9/10/70 |
| | *Other* |
| 112M | Alabama Power Co. 4⅛% Mtge. 5/1/83 |
| 50M | Alabama Power Co. 3¼% Mtge. 3/1/84 |
| 75M | Alabama Power Co. 3½% Mtge. 6/1/85 |
| 50M | Alabama Power Co. 4⅜% Mtge. 5/1/87 |
| 50M | Alabama Power Co. 3⅞% Mtge. 1/1/88 |
| 125M | Alabama Power Co. 4⅞% Mtge. 5/1/89 |
| 200M | Allied Chemical Corp. 3½% Deb. 4/1/78 |
| 50M | Aluminum Co. of America 3⅞% Deb. 4/1/83 |
| 54M | American Can Co. 4¾% Deb. 7/15/90 |
| 50M | American Telephone & Telegraph Co. 2¾% Deb. 2/1/71 |
| 70M | American Telephone & Telegraph Co. 3¼% Deb. 9/15/84 |
| 200M | American Telephone & Telegraph Co. 4⅜% Deb. 4/1/85 |
| 230M | American Telephone & Telegraph Co. 3⅞% Deb. 7/1/90 |
| 200M | American Telephone & Telegraph Co. 4⅜% Deb. 5/1/99 |
| 50M | Appalachian Electric Power Co. 3½% Mtge. 12/1/83 |
| 100M | Appalachian Electric Power Co. 4⅝% Mtge. 3/1/87 |
| 50M | Arkansas Power & Light Co. 4⅜% Mtge. 2/1/93 |
| 98M | Armco Steel Corp. 4.35% Deb. 4/1/84 |
| 50M | Armco Steel Corp. 4½% Deb. 6/1/86 |
| 70M | Atlantic Refining Co. 3¼% Deb. 1/15/79 |
| 50M | Bell Telephone Co. of Pennsylvania 4⅜% Deb. 2/1/2003 |

## Duke University Investments (Continued)

| *Bonds Par Value* | |
|---|---|
| 50M | Boston Edison Co. 4⅝% Mtge. 6/1/87 |
| 89M | C. I. T. Financial Corp. 3¼% Notes 7/2/63 |
| 850M | C. I. T. Financial Corp. 3.279309% Notes 7/5/63 |
| 100M | C. I. T. Financial Corp. 3¼% Notes 8/5/63 |
| 200M | C. I. T. Financial Corp. 3.303685% Notes 8/7/63 |
| 50M | C. I. T. Financial Corp. 3¼% Notes 8/7/63 |
| 50M | C. I. T. Financial Corp. 3¼% Notes 9/23/63 |
| 350M | C. I. T. Financial Corp. 3¼% Notes 10/14/63 |
| 130M | C. I. T. Financial Corp. 3.318302% Notes 11/4/63 |
| 100M | C. I. T. Financial Corp. 3.314025% Notes 11/4/63 |
| 190M | C. I. T. Financial Corp. 3¼% Notes 12/6/63 |
| 50M | C. I. T. Financial Corp. 4¾% Deb. 7/1/66 |
| 40M | C. I. T. Financial Corp. 3⅝% Deb. 9/1/70 |
| 100M | C. I. T. Financial Corp. 4⅝% Deb. 1/1/79 |
| 130M | C. I. T. Financial Corp. 5⅛% Deb. 1/15/80 |
| 125M | Carolina Power & Light Co. 3½% Mtge. 10/1/82 |
| 100M | Carolina Power & Light Co. 4½% Mtge. 11/1/91 |
| 50M | Central Illinois Light Co. 4⅝% Mtge. 7/1/87 |
| 100M | Central Illinois Light Co. 4⅞% Mtge. 3/1/90 |
| 50M | Central Illinois Public Service Co. 3⅜% Mtge. 9/1/77 |
| 200M | Central Illinois Public Service Co. 4¾% Mtge. 1/1/89 |
| 100M | Central Power & Light Co. 4¾% Mtge. 4/1/89 |
| 50M | The Champion Paper Co. 3¾% Deb. 7/15/81 |
| 50M | Chesapeake & Potomac Telephone Co. 4⅜% Deb. 2/1/98 |
| 50M | Cincinnati Gas & Electric Co. 4⅛% Mtge. 5/1/87 |
| 50M | Columbus & Southern Ohio Electric Co. 3¾% Mtge. 4/1/86 |
| 80M | Commercial Credit Co. 3¼% Notes 8/26/63 |
| 15M | Commercial Credit Co. 3¼% Notes 9/25/63 |
| 64M | Commercial Credit Co. 3¼% Notes 10/14/63 |
| 300M | Commercial Credit Co. 3.454342% Notes 12/5/63 |
| 20M | Commercial Credit Co. 3⅝% Notes 2/1/76 |
| 50M | Commercial Credit Co. 5% Notes 6/1/77 |
| 70M | Commercial Credit Co. 4¼% Notes 11/1/80 |
| 50M | Commonwealth Edison Co. 4¼% Mtge. 3/1/87 |
| 98M | Commonwealth Edison Co. 4⅝% Deb. 1/1/2009 |
| 75M | Consolidated Edison Co. of N.Y. 3½% Mtge. 2/1/83 |
| 75M | Consolidated Edison Co. of N.Y. 3⅜% Mtge. 1/1/84 |
| 50M | Consolidated Edison Co. of N.Y. 3⅝% Mtge. 5/1/86 |
| 100M | Consolidated Edison Co. of N.Y. 4¼% Mtge. 10/1/86 |
| 50M | Consolidated Edison Co. of N.Y. 5% Mtge. 10/1/87 |
| 100M | Consolidated Edison Co. of N.Y. 4⅝% Mtge. 11/1/91 |
| 200M | Consolidated Edison Co. of N.Y. 4⅜% Mtge. 10/1/92 |
| 46M | Consolidated Natural Gas Co. 4⅞% Deb. 6/1/82 |
| 47M | Consolidated Natural Gas Co. 5% Deb. 9/1/82 |
| 100M | Consolidated Natural Gas Co. 4⅜% Deb. 2/1/86 |
| 100M | Consolidated Natural Gas Co. 4¾% Deb. 5/1/86 |
| 50M | Consolidated Natural Gas Co. 4⅜% Deb. 4/1/88 |
| 27M | Consumers Power Co. 4⅜% Conv. Deb. 8/15/75 |
| 50M | Consumers Power Co. 4% Mtge. 8/1/86 |
| 20M | Consumers Power Co. 4¾% Mtge. 10/1/87 |
| 50M | Consumers Power Co. 4½% Mtge. 10/1/88 |
| 100M | Consumers Power Co. 3¼% Mtge. 2/1/90 |
| 45M | Delaware Power and Light Co. 3⅞% Mtge. 6/1/88 |
| 50M | Detroit Edison Co. 3¼% Mtge. 5/15/80 |
| 100M | Diamond State Telephone Co. 4¾% Deb. 4/1/94 |
| 200M | Duke Power Co. 3% Mtge. 1/1/75 |
| 500M | Duke Power Co. 2.65% Mtge. 9/1/77 |
| 348M | Duke Power Co. 4⅞% Deb. 9/1/82 |

## Duke University Investments (Continued)

| *Bonds Par Value* | |
|---|---|
| 100M | Duke Power Co. 3⅝% Mtge. 5/1/86 |
| 600M | Duke Power Co. 4¼% Mtge. 8/1/92 |
| 50M | Duquesne Light Co. 3⅝% Mtge. 9/1/83 |
| 50M | Duquesne Light Co. 3½% Mtge. 4/1/86 |
| 9M | Durham Investment Corp. 5% Deb. 12/31/77 |
| 2.5M | Florida East Coast Railway Co. 5% Mtge. 1/1/2011 |
| 2.5M | Florida East Coast Railway Co. 5½% Second Mtge. 1/1/2011 |
| 50M | General Electric Co. 3½% Deb. 5/1/76 |
| 670M | General Motors Acceptance Corp. 3.452685% Notes 12/11/63 |
| 70M | General Motors Acceptance Corp. 3⅜% Notes 1/6/64 |
| 100M | General Motors Acceptance Corp. 3% Deb. 7/15/69 |
| 125M | General Motors Acceptance Corp. 3½% Deb. 3/15/72 |
| 100M | General Motors Acceptance Corp. 4⅝% Deb. 9/1/82 |
| 50M | General Motors Acceptance Corp. of Canada, Ltd. 4% Deb. 6/1/64 |
| 150M | General Motors Acceptance Corp. of Canada, Ltd. 4¾% Deb. 1/15/68 |
| 50M | General Motors Acceptance Corp. of Canada, Ltd. 4¾% Deb. 12/15/69 |
| 150M | General Motors Corp. 3¼% Deb. 1/1/79 |
| 100M | Georgia Power Co. 3⅜% Mtge. 7/1/82 |
| 55M | Georgia Power Co. 3¾% Mtge. 4/1/83 |
| 100M | Georgia Power Co. 3⅛% Mtge. 4/1/84 |
| 75M | Georgia Power Co. 3⅜% Mtge. 5/1/85 |
| 50M | Georgia Power Co. 3⅝% Mtge. 4/1/86 |
| 37M | Georgia Power Co. 5¼% Mtge. 6/1/87 |
| 50M | Gulf States Utilities Co. 3⅛% Mtge. 12/1/82 |
| 100M | Gulf States Utilities Co. 3⅜% Mtge. 12/1/83 |
| 50M | Gulf States Utilities Co. 4⅞% Mtge. 10/1/87 |
| 200M | Gulf States Utilities Co. 4¼% Mtge. 1/1/89 |
| 100M | Gulf States Utilities Co. 5¼% Mtge. 12/1/89 |
| 75M | Houston Lighting & Power Co. 4¾% Mtge. 11/1/87 |
| 95M | Idaho Power Co. 4½% Mtge. 10/15/88 |
| 100M | Illinois Bell Telephone Co. 4⅜% Mtge. 3/1/94 |
| 100M | Illinois Power Co. 3½% Mtge. 11/1/83 |
| 50M | Illinois Power Co. 3¾% Mtge. 7/1/86 |
| 50M | Illinois Power Co. 4% Mtge. 5/1/88 |
| 50M | Imperial Oil, Ltd. 3⅜% Deb. 2/1/75 |
| 50M | Inland Steel Co. 3½% Mtge. 7/1/81 |
| 48M | Inland Steel Co. 4⅜% Mtge. 7/1/87 |
| 188M | Inland Steel Co. 4½% Mtge. 2/1/89 |
| 100M | Iowa Illinois Gas & Electric Co. 4⅞% Mtge. 5/1/91 |
| 100M | Kansas City Power & Light Co. 3¼% Mtge. 1/15/83 |
| 75M | Long Island Lighting Co. 3⅜% Mtge. 10/1/82 |
| 125M | Long Island Lighting Co. 3¼% Mtge. 12/1/84 |
| 100M | Long Island Lighting Co. 4⅛% Mtge. 5/1/88 |
| 98M | P. Lorillard Co. 3¾% Deb. 4/1/78 |
| 100M | P. Lorillard Co. 4⅞% Deb. 6/1/86 |
| 50M | Louisville Gas and Electric Co. 4⅞% Mtge. 9/1/87 |
| 100M | May Department Stores Co. 3¼% Deb. 2/1/78 |
| 250M | Michigan Bell Telephone Co. 4⅜% Deb. 12/1/91 |
| 60M | Michigan Bell Telephone Co. 4¾% Deb. 11/1/92 |
| 50M | Minneapolis-Honeywell Regulator Co. 3¾% Deb. 8/1/76 |
| 100M | Monongahela Power Co. 4¾% Mtge. 4/1/84 |
| 50M | Montana Power Co. 2⅞% Mtge. 10/1/75 |
| 200M | Montana Power Co. 4½% Mtge. 4/1/89 |
| 180M | Mountain States Telephone and Telegraph Co. 4⅜% Deb. 2/1/88 |
| 60M | National Steel Corp. 3⅞% Mtge. 11/1/86 |
| 50M | New England Power Co. 3¼% Mtge. 1/1/85 |
| 100M | New England Power Co. 4⅝% Mtge. 11/1/91 |
| 100M | New England Telephone & Telegraph Co. 3¼% Deb. 12/15/77 |

## Duke University Investments (Continued)

| *Bonds Par Value* | |
|---|---|
| 50M | New England Telephone & Telegraph Co. 3⅛% Deb. 12/15/88 |
| 125M | New Jersey Bell Telephone Co. 3⅞% Deb. 4/1/93 |
| 60M | New York State Electric & Gas Corp. 3⅜% Mtge. 9/1/85 |
| 100M | New York Telephone Co. 4½% Mtge. 5/15/91 |
| 50M | New York Telephone Co. 3⅜% Mtge. 4/1/96 |
| 75M | Niagara Mohawk Power Corp. 3½% Mtge. 2/1/83 |
| 50M | Niagara Mohawk Power Corp. 3⅝% Mtge. 5/1/86 |
| 50M | Niagara Mohawk Power Corp. 4⅞% Mtge. 9/1/87 |
| 50M | Niagara Mohawk Power Corp. 3⅞% Mtge. 6/1/88 |
| 100M | Northern Indiana Public Service Co. 4½% Mtge. 1/15/89 |
| 49M | Northern States Power Co. 4⅜% Mtge. 6/1/87 |
| 200M | Northwestern Bell Telephone Co. 4⅜% Deb. 3/1/2003 |
| 65M | Ohio Edison Co. 3¼% Mtge. 1/1/84 |
| 150M | Ohio Edison Co. 4½% Mtge. 4/1/89 |
| 125M | Ohio Power Co. 3⅜% Mtge. 1/1/83 |
| 50M | Ohio Power Co. 4¼% Mtge. 11/1/86 |
| 200M | Ohio Power Co. 4⅝% Mtge. 4/1/89 |
| 120M | Pacific Gas & Electric Co. 3⅛% Mtge. 6/1/84 |
| 35M | Pacific Gas & Electric Co. 4½% Mtge. 12/1/86 |
| 50M | Pacific Gas & Electric Co. 3⅜% Mtge. 12/1/88 |
| 50M | Pacific Gas & Electric Co. 5% Mtge. 6/1/89 |
| 100M | Pacific Telephone & Telegraph Co. 3¼% Deb. 11/15/79 |
| 50M | Pacific Telephone & Telegraph Co. 5⅛% Deb. 8/1/80 |
| 250M | Pacific Telephone & Telegraph Co. 4⅜% Deb. 8/15/88 |
| 150M | Pacific Telephone & Telegraph Co. 3⅛% Deb. 11/15/89 |
| 200M | Pacific Telephone & Telegraph Co. 4⅝% Deb. 11/1/90 |
| 500M | Participation In Commercial Loans 4½% 12/31/63 |
| 100M | Pennsylvania Power & Light Co. 4⅝% Mtge. 12/1/91 |
| 115M | Philadelphia Electric Co. 3⅛% Mtge. 4/1/85 |
| 20M | Phillips Petroleum Company 4¼% Conv. Deb. 2/15/87 |
| 100M | Pillsbury Mills, Inc. 3⅛% Deb. 12/1/72 |
| 50M | Plantation Pipe Line Co. 3½% Deb. 4/1/86 |
| 60M | Province of Ontario, Canada 3¼% Deb. 9/1/72 |
| 200M | Province of Ontario, Canada 3¼% Deb. 2/1/75 |
| 75M | Province of Ontario, Canada 3⅛% Deb. 3/15/80 |
| 200M | Province of Ontario, Canada 4¼% Deb. 2/1/84 |
| 55M | Public Service Co. of Indiana, Inc. 3⅜ Mtge. 1/1/84 |
| 200M | Public Service Co. of Indiana, Inc. 4⅜% Mtge. 2/1/89 |
| 50M | Public Service Electric & Gas Co. 3¼% Mtge. 5/1/84 |
| 200M | Public Service Electric & Gas Co. 4⅝% Mtge. 8/1/88 |
| 200M | San Diego Gas & Electric Co. 4⅝% Deb. 1/15/84 |
| .40M | Scarsdale Golf Club, Inc. 4% Bonds 12/1/74 |
| 30M | Sinclair Oil Corp. 4⅜% Conv. Deb. 12/1/86 |
| 50M | Southern Bell Telephone & Telegraph Co. 4% Deb. 10/1/83 |
| 50M | Southern Bell Telephone & Telegraph Co. 5% Deb. 6/1/86 |
| 150M | Southern Bell Telephone & Telegraph Co. 4⅝% Deb. 12/1/93 |
| 100M | Southern Bell Telephone & Telegraph Co. 4⅜% Deb. 3/1/98 |
| 50M | Southern California Edison Co. 3⅝% Mtge. 8/15/78 |
| 59M | Southern California Edison Co. 3⅜% Mtge. 4/15/81 |
| 40M | Southern California Edison Co. 4⅛% Mtge. 2/15/82 |
| 48M | Southern California Edison Co. 4¼% Mtge. 7/1/82 |
| 50M | Southern California Edison Co. 4⅛% Mtge. 9/1/82 |
| 75M | Southern California Edison Co. 4⅜% Mtge. 9/1/85 |
| 100M | Southern California Edison Co. 4½% Mtge. 4/1/86 |
| 70M | Southern California Edison Co. 4⅜% Mtge. 5/15/88 |
| 100M | Southern California Gas Co. 3⅞% Mtge. 6/1/81 |
| 50M | Southern New England Telephone & Telegraph Co. 3⅛% Deb. 3/1/78 |
| 50M | Sterling Drug Co., Inc. 3¼% Deb. 4/1/80 |

## Duke University Investments (Continued)

*Bonds*
*Par Value*

| | |
|---|---|
| 50M | Superior Oil Co. 3¾% Deb. 7/1/81 |
| 50M | Tampa Electric Co. 4¼% Mtge. 7/1/88 |
| 41M | Tennessee Gas Transmission Co. 6% Deb. 11/1/77 |
| 50M | Union Electric Co. 3¾% Mtge. 7/1/86 |
| 100M | Union Electric Co. 4⅜% Mtge. 3/1/88 |
| 50M | United States Steel Corp. 4% Deb. 7/15/83 |
| 200M | United States Steel Corp. 4½% Deb. 4/15/86 |
| 50M | Utah Power & Light Co. 3½% Mtge. 10/1/82 |
| 50M | Virginia Electric & Power Co. 4⅛% Mtge. 10/1/86 |
| 100M | Virginia Electric & Power Co. 4½% Mtge. 12/1/87 |
| 100M | Virginia Electric & Power Co. 4⅞% Mtge. 6/1/91 |
| 50M | Washington Water Power Co. 4⅞% Mtge. 7/1/87 |
| 50M | West Penn Power Co. 4⅛% Mtge. 7/1/87 |
| 25M | West Virginia Pulp & Paper Co. 4% Deb. 1/1/78 |
| 50M | Wisconsin Electric Power Co. 3¾% Mtge. 4/15/86 |
| 100M | Wisconsin Power & Light Co. 4⅝% Mtge. 3/1/89 |
| 50M | Wisconsin Telephone Co. 4½% Deb. 7/1/92 |

*Stocks*
*No. of Shares*

| | |
|---|---|
| 5,313 | Alleghany Power System, Inc. |
| 300 | Allied Chemical Corp. |
| 30,000 | Aluminium, Ltd. |
| 6,000 | Amerada Petroleum Corp. |
| 10,600 | American Cyanamid Co. |
| 400 | American Electric Power Co., Inc. |
| 17,041 | American Telephone & Telegraph Co. |
| 650 | American Tobacco Co. 6% Cum. Pfd. |
| 2,000 | Ampex Corp. |
| 2,700 | Avco Corp. |
| 18,000 | Baltimore Gas & Electric Co. |
| 333 | Bankers Trust Co. |
| 7,400 | Borg-Warner Corp. |
| 1,000 | Bristol-Myers Co. |
| 100 | Business Development Corp. of North Carolina |
| 14,000 | C. I. T. Financial Corp. |
| 2,000 | Campbell Soup Co. |
| 1,505 | Cannon Mills Co. |
| 2,605 | Cannon Mills Co. B |
| 3,005 | Carolina Power & Light Co. |
| 210 | Carolina Telephone & Telegraph Co. |
| 6,000 | Champion Papers, Inc. |
| 2,652 | Chase Manhattan Bank |
| 9,200 | Chemical Bank New York Trust Co. |
| 25,532 | Cincinnati Gas & Electric Co. |
| 2,200 | Coca-Cola Co. |
| 400 | Commercial Credit Co. |
| 11,127 | Commonwealth Edison Co. |
| 5,200 | Consolidated Edison Co. of N.Y., Inc. |
| 10,028 | Consumers Power Co. |
| 20,000 | Container Corp. of America |
| 3,500 | Continental Illinois National Bank & Trust Co. of Chicago |
| 3,000 | Continental Oil Co. |
| 800 | Corn Products Co. |
| 600 | Corning Glass Works |

## Duke University Investments (Continued)

| *Stocks*<br>*No. of Shares* | |
|---|---|
| 15,189 | Dayton Power & Light Co. |
| 10 | Denny Roll & Panel Co. |
| 5,000 | Detroit Edison Co. |
| 140,000 | Duke Power Co. |
| 4,100 | E. I. DuPont de Nemours & Co. |
| 800 | Duquesne Light Co. |
| 600 | Durham Investment Corp. |
| 8,600 | Eastman Kodak Co. |
| 500 | El Paso Natural Gas Co. 5.5% Pfd. |
| 5,000 | Fidelity Philadelphia Trust Co. |
| 7,144 | First National Bank of Boston |
| 7,580 | First National City Bank of N.Y. |
| 160 | Florida East Coast Railway Co. |
| 11,000 | General Electric Co. |
| 4,000 | General Foods Corp. |
| 480 | General Motors Corp. |
| 3,336 | General Motors Corp. $5 Pfd. |
| 2,000 | General Telephone & Electronics Corp. |
| 2,900 | Gillette Co. |
| 2,000 | Ginn and Co. |
| 2,000 | B. F. Goodrich Co. |
| 9,852 | Gulf Oil Corp. |
| 5,655 | P. H. Hanes Knitting Co. |
| 11,800 | Indianapolis Power & Light Co. |
| 5,000 | Ingersoll-Rand Co. |
| 2,000 | Inland Steel Co. |
| 8,992 | International Business Machines Corp. |
| 500 | International Harvester Co. |
| 5,200 | International Nickel Co. of Canada, Ltd. |
| 8,746 | International Paper Co. |
| 4,500 | International Telephone & Telegraph Corp. |
| 5,555 | J. B. Ivey & Co. |
| 4,002 | J. A. Jones Construction Co. 5% Pfd. |
| 13,400 | Kansas City Power & Light Co. |
| 3,100 | Libbey-Owens-Ford Glass Co. |
| 3,500 | Liggett & Myers Tobacco Co. |
| 4,000 | Link Belt Co. |
| 30 | Long Meadow Farms Cooperative, Inc. 5% Cum. Pfd. |
| 1,000 | P. Lorillard Co. |
| 7,900 | Louisiana Land & Exploration Co. |
| 6,000 | Louisville Gas & Electric Co. |
| 6,252 | Manufacturers Hanover Trust Co. |
| 3,500 | Merck & Co., Inc. |
| 6,000 | Middle South Utilities, Inc. |
| 1,500 | Minneapolis-Honeywell Regulator Co. |
| 10,201 | Monsanto Chemical Co. |
| 14,850 | Morgan Guaranty Trust Co. of N.Y. |
| 3,500 | National Cash Register Co. |
| 7,000 | National Lead Co. |
| 4,000 | National Steel Corp. |
| 9,856 | New York State Electric & Gas Co. |
| 750 | North Carolina National Bank |
| 9,900 | Ohio Edison Co. |
| 8,200 | Owens Illinois Glass Co. |
| 12,600 | Pacific Gas & Electric Co. |
| 200 | Pacific Lighting Corp. $4.36 Pfd. |
| 3 | Pamlico Power & Light Co., Inc. 5% Pfd. |
| 1,000 | The Permian Corp. |
| 15,439 | Philadelphia Electric Co. |

## Duke University Investments (Continued)

*Stocks*

| *No. of Shares* | |
|---|---|
| 4,000 | Phillips Petroleum Company |
| 5,000 | Procter & Gamble Co. |
| 116,100 | R. J. Reynolds Tobacco Co. B |
| 4,600 | Shell Oil Co. |
| 10,000 | Socony Mobil Oil Company, Inc. |
| 4,000 | The Southern Company |
| 530 | Sperry Rand Corp. |
| 340 | Spindale Mills, Inc. |
| 6,663 | Standard Oil Co. of California |
| 3,000 | Standard Oil Co. (Indiana) |
| 20,977 | Standard Oil Co. (New Jersey) |
| 31,236 | Texaco, Inc. |
| 1,000 | Texas Eastern Transmission Corp. 5% Pfd. |
| 3,000 | Texas Instruments, Inc. |
| 2,500 | Union Carbide Corp. |
| 6,500 | United Aircraft Corp. |
| 6,000 | United Biscuit Company of America |
| 1,500 | United States Steel Corporation |
| 2,250 | Wachovia Bank & Trust Company |
| 400 | Westinghouse Electric Corporation |
| 2,000 | Xerox Corporation |

## GIFTS AND BEQUESTS

Duke University derives its principal support from endowment funds and from miscellaneous gifts and grants. Permanently invested capital funds enable the University to offer to students academic and professional training at a fraction of its actual cost. The effectiveness of the University is determined to a large extent by its financial resources.

Gifts and bequests devoted to the improvement of the work of the University will be received and administered by the Trustees in accordance with the desires of the donor.

GIFTS. Any kind of property, real or personal, may be the subject of a gift and only such form as is required to pass title is necessary. If the gift consists of real property, the title will be passed by deed; if it consists of cash or unregistered bonds, the gift is consummated by delivery of the property; or if stocks, by delivery of properly endorsed stock certificates. Unless restricted, the use of gifts is at the discretion of the Board of Trustees. Usually the proceeds, conservatively invested, are added to the permanent endowment of the University. The donor may, however, restrict the use of any gift and designate definitely the object for which it shall be used. In such cases, the transfer of property should be accompanied by a letter or other document describing in detail the objects for which the proceeds of the gift are to be used and when accepted by the University the terms or conditions set out therein become binding upon it.

BEQUESTS. Bequests may be made to the University by an appropriate clause inserted in a will or by codicil to a will already drawn. The forms shown on the following page will serve as appropriate clauses for wills or codicils.

# FORMS FOR BEQUESTS

## General

I give, devise and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina and located in the City and County of Durham, State of North Carolina, and its successors forever, the sum of.....

.....Dollars

(or otherwise describe the gift) for the general purposes and uses of the University at the discretion of the Board of Trustees.

## Specific

I give, devise and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina and located in the City and County of Durham, State of North Carolina, and its successors forever, the sum of.....

.....Dollars

(or otherwise describe the gift) and direct that the income therefrom shall be used for the following purposes, viz. (here describe in detail the use desired).

## Codicil

Having hereinbefore made my last Will and Testament dated.....

....., and being of sound mind, I hereby make, publish, and declare the following codicil thereto; (here insert clause in same form as if it had been included in body of Will). Except as hereinbefore changed, I hereby ratify, confirm and republish my said last Will and Testament.

(It is strongly recommended that a competent lawyer be employed to prepare the will and to supervise its execution in order to comply with all the requirements of the law of the state in which the maker of the will resides. It is also wise to give the University considerable latitude in the use of any fund so that a change of circumstances may not impair the usefulness of the gift. The Treasurer of the University will be glad upon request to review the phrasing of any proposed form of bequest.)

# Bulletin of Duke University

## Admissions Newsletter

VOLUME 36 NOVEMBER, 1963 NUMBER 2


## Report on Freshman Classes Entering in September, 1963

For the second year, the three-phased admissions calendar proved to furnish stability in the processing of decisions in that approximately one-half of the entering freshman class of the Woman's College and one-third of the entering freshman class of Trinity College and the College of Engineering were accepted under the two Early Decision Plans of October 15 and February 1. For September of 1963, there were 315 fewer applications, but even so on objective criteria the class again showed an increase on these measurements.

As candidates are more and more clustered at one end of a spectrum, it is evident that subjective factors and judgment play a more influential role in the selection of candidates. Such factors as special abilities and interests of the candidate; the strength of his academic program in secondary school, both as to its subject matter and its depth as demonstrated by accelerated and advanced courses; the subjective descriptions of the candidate by his school officials; all these have a strong influence on the decision reached.

It is gratifying to report a healthy growth in the number of freshmen presenting Advanced Placement Program Tests from 120 in 1962 to 179 this year. These students are currently receiving an average award of six semester hours of credit per student.

The catalogue requirement of fifteen units of secondary school studies is not a picture of the entering classes in which a majority have earned eighteen such academic units.

W. L. Brinkley, Jr.
Director of Undergraduate Admissions

# Trinity College

## 1. Overall figures

| | | |
|---|---|---|
| Total Applications | 2361 | |
| Total Accepted | 1029 | (44% of Applications) |
| Total Matriculated | 598 | (58% of group accepted) |

## 2. School background

| | *Public* | | *Independent* | |
|---|---|---|---|---|
| Applied | 1705 | | 656 | |
| Accepted | 779 | (46% of Applied) | 250 | (38% of Applied) |
| Matriculated | 429 | (55% of Accepted) | 169 | (68% of Accepted) |

The class of 1967 consists of 72% of public school graduates from 324 schools and 28% independent school graduates from 110 schools.

## 3. Class Rank

PUBLIC SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 709 | 51[illegible] | 253 |
| 2nd Decile | 411 | 185 | 109 |
| 3rd Decile | 236 | 55 | 45 |
| 4th Decile | 116 | 12 | 12 |
| 5th Decile | 66 | [illegible] | 6 |
| 6th Decile | 25 | [illegible] | 3 |
| 7th Decile | 8 | [illegible] | 0 |
| 8th Decile | 4 | 2 | 1 |
| 9th Decile | 6 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| Not given | 124 | [illegible] | 0 |
| Total | 1705 | 779 | 429 |

INDEPENDENT SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 131 | 91 | 60 |
| 2nd Decile | 106 | 51 | 32 |
| 3rd Decile | 92 | 38 | 24 |
| 4th Decile | 73 | 20 | 15 |
| 5th Decile | 71 | 22 | 19 |
| 6th Decile | 58 | 18 | 13 |
| 7th Decile | 23 | [illegible] | 1 |
| 8th Decile | 30 | [illegible] | 5 |
| 9th Decile | 16 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| Not given | 55 | 0 | 0 |
| Total | 656 | 250 | 169 |

## 4. College Board Scholastic Aptitude Test

SAT—*VERBAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 26 | 23 | 10 |
| 700-749 | 155 | 132 | 64 |
| 650-699 | 354 | 273 | 135 |
| 600-649 | 442 | 273 | 168 |
| 550-599 | 447 | 177 | 119 |
| 500-549 | 430 | 110 | 74 |
| 450-499 | 279 | 28 | 19 |
| 400-449 | 139 | 10 | 6 |
| 350-399 | 45 | 2 | 2 |
| Below 349 | 12 | 1 | 1 |
| Not given | 31 | 0 | 0 |
| Total | 2361 | 1029 | 598 |

SAT—*MATHEMATICAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 86 | 76 | 32 |
| 700-749 | 330 | 253 | 144 |
| 650-699 | 469 | 306 | 168 |
| 600-649 | 506 | 206 | 131 |
| 550-599 | 451 | 120 | 73 |
| 500-549 | 278 | 49 | 34 |
| 450-499 | 131 | 16 | 12 |
| 400-449 | 62 | 3 | 3 |
| 350-399 | 14 | 1 | 1 |
| Below 349 | 4 | 0 | 0 |
| Not given | 31 | 0 | 0 |
| Total | 2361 | 1029 | 598 |

## 5. Scholastic Aptitude Test Mean Scores of Matriculated Freshmen

Verbal.....617 Math.....654

## 6. College Board Achievement Test in English Composition

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 25 | 22 | 9 |
| 700-749 | 73 | 64 | 28 |
| 650-699 | 218 | 176 | 91 |
| 600-649 | 386 | 283 | 166 |
| 550-599 | 442 | 242 | 145 |
| 500-549 | 328 | 154 | 102 |
| 450-499 | 365 | 64 | 39 |
| 400-449 | 384 | 15 | 10 |
| 350-399 | 69 | 9 | 8 |
| Below 349 | 27 | 0 | 0 |
| Not given | 144 | 0 | 0 |
| Total | 2361 | 1029 | 598 |

## 7. College Board English Composition Achievement Test Mean Score of Matriculated Freshmen

..... 588

## 8. Geographical Distribution of Matriculated Freshmen

| | | | |
|---|---|---|---|
| Alabama | 8 | Missouri | 8 |
| Arizona | 1 | Nebraska | 1 |
| California | 5 | New Jersey | 44 |
| Colorado | 3 | New Mexico | 1 |
| Connecticut | 11 | New York | 33 |
| Delaware | 7 | North Carolina | 121 |
| District of Columbia | 8 | Ohio | 17 |
| Florida | 47 | Oklahoma | 7 |
| Georgia | 26 | Pennsylvania | 34 |
| Hawaii | 1 | Rhode Island | 2 |
| Illinois | 24 | South Carolina | 22 |
| Indiana | 7 | Tennessee | 15 |
| Kansas | 3 | Texas | 22 |
| Kentucky | 3 | Virginia | 46 |
| Louisiana | 2 | Washington | 2 |
| Maine | 1 | West Virginia | 6 |
| Maryland | 25 | Wisconsin | 5 |
| Massachusetts | 13 | Alaska | 1 |
| Michigan | 2 | Outside U. S. | 6 |
| Minnesota | 3 | | |
| Mississippi | 4 | Total | 598 |

## 9. Alumni Sons

| | | |
|---|---|---|
| Applied | 153 | |
| Accepted | 88 | (58% of sons applying) |
| Matriculated | 74 | (84% of those accepted) |

# Financial Aid to Freshmen Entering Duke University, Fall 1963

I. Overall Figures

| | |
|---|---|
| Total number of aid applicants accepted for admission | 841 |
| Competitive Duke University Awards accepted (including Angier B. Duke Memorial Scholarships, W. N. Reynolds Memorial Scholarships, School of Nursing Scholarships, and Grants-in-Aid) | 311 |
| Value of Duke University Awards accepted | $225,375.00 |
| Awards sponsored by industry, civic clubs, etc., including those administered by Duke University | 70 |
| Value of awards from sources outside the University | $ 47,311.50 |
| Remissions of Tuition to children of Methodist ministers residing in the North Carolina Conferences and Tuition Grants to children of Duke University Faculty members | 31 |
| Value of Remissions of Tuition and Tuition Grants | $ 32,550.00 |
| Athletic Awards | 29 |
| Value of Athletic Awards | $ 30,450.00 |
| Total number of awards accepted | 441 |
| Total value of awards accepted | $335,686.50 |
| Average value of awards | $ 761.00 |

II. Scholastic Aptitude Test scores of recipients of Duke University awards and remissions of tuition. Figures are not included for those who received aid from outside sources, loans, or jobs.

| *Verbal Score Range* | *Woman's College* | *Trinity College and College of Engineering* |
|---|---|---|
| 700-800 | 28.7% | 13.1% |
| 600-700 | 58.3% | 46.9% |
| 500-600 | 12.8% | 31.6% |
| 400-500 | — | 6.9% |
| Below 400 | — | .8% |

| *Math Score Range* | *Woman's College* | *Trinity College and College of Engineering* |
|---|---|---|
| 700-800 | 22.7% | 31.2% |
| 600-700 | 50.4% | 45.6% |
| 500-600 | 22.7% | 18.9% |
| 400-500 | 3.9% | 3.6% |
| Below 400 | — | — |

III. *Class rank in secondary schools of aid applicants accepted for admission.*

| | *Men* | | *Women* | |
|---|---|---|---|---|
| *Class Rank* | *Number accepted* | *Per cent offered aid* | *Number accepted* | *Per cent offered aid* |
| Top fifth | 515 | 52% | 270 | 89% |
| Second fifth | 18 | 56 | 7 | 57 |
| Third fifth | 10 | 40 | 0 | 0 |
| Fourth fifth | 3 | 100 | 0 | 0 |
| Bottom fifth | 0 | 0 | 0 | 0 |
| Not available | 14 | 29 | 4 | 25 |

IV. 1. 214 men or 30% of the freshman class of Trinity College and the College of Engineering enrolled with aid.
2. 101 women or 31% of the freshman class of the Woman's College enrolled with aid.

# College of Engineering

## 1. Overall figures

| | | |
|---|---|---|
| Total Applications | 404 | |
| Total Accepted | 229 | (57% of Applications) |
| Total Matriculated | 113 | (49% of group accepted) |

## 2. School background

| | *Public* | *Independent* |
|---|---|---|
| Applied | 299 | 105 |
| Accepted | 178 (60% of Applied) | 51 (49% of Applied) |
| Matriculated | 91 (51% of Accepted) | 22 (43% of Accepted) |

The class of 1967 consists of 81% of public school graduates from 87 schools and 19% independent school graduates from 22 schools.

## 3. Class Rank

PUBLIC SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 109 | 89 | 43 |
| 2nd Decile | 78 | 46 | 25 |
| 3rd Decile | 56 | 31 | 16 |
| 4th Decile | 25 | 9 | 5 |
| 5th Decile | 14 | 2 | 2 |
| 6th Decile | 8 | 1 | 0 |
| 7th Decile | 0 | 0 | 0 |
| 8th Decile | 1 | 0 | 0 |
| 9th Decile | 0 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| None given | 8 | 0 | 0 |
| Total | 299 | 178 | 91 |

INDEPENDENT SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 25 | 20 | 8 |
| 2nd Decile | 21 | 13 | 6 |
| 3rd Decile | 11 | 7 | 4 |
| 4th Decile | 13 | 5 | 2 |
| 5th Decile | 10 | 4 | 2 |
| 6th Decile | 4 | 1 | 0 |
| 7th Decile | 2 | 0 | 0 |
| 8th Decile | 5 | 0 | 0 |
| 9th Decile | 4 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| None given | 10 | 1 | 0 |
| Total | 105 | 51 | 22 |

## 4. College Board Scholastic Aptitude Test

SAT—*VERBAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 1 | 1 | 1 |
| 700-749 | 18 | 15 | 4 |
| 650-699 | 43 | 37 | 16 |
| 600-649 | 77 | 62 | 28 |
| 550-599 | 67 | 44 | 24 |
| 500-549 | 81 | 48 | 27 |
| 450-499 | 70 | 18 | 10 |
| 400-449 | 23 | 2 | 1 |
| 350-399 | 13 | 2 | 2 |
| Below 349 | 1 | 0 | 0 |
| Not given | 10 | 0 | 0 |
| Total | 404 | 229 | 113 |

SAT—*MATHEMATICAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 29 | 26 | 10 |
| 700-749 | 55 | 54 | 24 |
| 650-699 | 93 | 68 | 39 |
| 600-649 | 106 | 53 | 23 |
| 550-599 | 57 | 22 | 12 |
| 500-549 | 30 | 4 | 3 |
| 450-499 | 10 | 1 | 1 |
| 400-499 | 3 | 1 | 1 |
| 350-399 | 1 | 0 | 0 |
| Below 349 | 0 | 0 | 0 |
| Not given | 10 | 0 | 0 |
| Total | 404 | 229 | 113 |

## 5. Scholastic Aptitude Test Mean Scores of Matriculated Freshmen

| | | | |
|---|---|---|---|
| Verbal | 580 | Math | 666 |

## 6. College Board Achievement Test in English Composition

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 1 | 1 | 0 |
| 700-749 | 12 | 10 | 4 |
| 650-699 | 23 | 20 | 4 |
| 600-649 | 54 | 43 | 25 |
| 550-599 | 74 | 54 | 23 |
| 500-549 | 73 | 52 | 29 |
| 450-499 | 71 | 35 | 17 |
| 400-449 | 40 | 12 | 7 |
| 350-399 | 19 | 6 | 3 |
| Below 349 | 6 | 1 | 1 |
| Not given | 36 | 0 | 0 |
| Total | 404 | 229 | 113 |

## 7. College Board English Composition Achievement Test Mean Score of Matriculated Freshmen

548

## 8. Geographical Distribution of Matriculated Freshmen

| | | | |
|---|---|---|---|
| Alabama | 1 | North Carolina | 15 |
| Connecticut | 7 | Ohio | 6 |
| Delaware | 2 | Pennsylvania | 10 |
| District of Columbia | 3 | Rhode Island | 3 |
| Florida | 13 | South Carolina | 5 |
| Georgia | 3 | Tennessee | 4 |
| Illinois | 1 | Texas | 1 |
| Kansas | 1 | Vermont | 1 |
| Maryland | 4 | Virginia | 14 |
| Massachusetts | 5 | West Virginia | 2 |
| Michigan | 1 | Wisconsin | 2 |
| New Jersey | 2 | Outside U. S. | 2 |
| New York | 7 | Total | 113 |

## 9. Alumni Sons

| | |
|---|---|
| Applied | 17 |
| Accepted | 9 (53% of sons applying) |
| Matriculated | 5 (56% of those accepted) |

# The Woman's College

## 1. Overall figures

| | | |
|---|---|---|
| Total Applications | 1664 | |
| Total Accepted | 489 | (29% of Applications) |
| Total Matriculated | 324 | (66% of group accepted) |

## 2. School background

| | *Public* | *Independent* |
|---|---|---|
| Applied | 1300 | 364 |
| Accepted | 356 (27% of Applied) | 133 (37% of Applied) |
| Matriculated | 225 (63% of Accepted) | 99 (37% of Accepted) |

The class of 1967 consists of 69% public school graduates from 182 schools and 31% independent school graduates from 87 schools.

## 3. Class Rank

PUBLIC SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 798 | 317 | 199 |
| 2nd Decile | 257 | 22 | 14 |
| 3rd Decile | 118 | 12 | 7 |
| 4th Decile | 38 | 2 | 2 |
| 5th Decile | 17 | 0 | 0 |
| 6th Decile | 11 | 1 | 1 |
| 7th Decile | 1 | 0 | 0 |
| 8th Decile | 0 | 0 | 0 |
| 9th Decile | 2 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| None Given | 58 | 2 | 2 |
| Total | 1300 | 356 | 225 |

INDEPENDENT SCHOOL APPLICANTS

| *Secondary School Class Rank* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| Top Decile | 139 | 84 | 68 |
| 2nd Decile | 68 | 23 | 15 |
| 3rd Decile | 48 | 4 | 2 |
| 4th Decile | 26 | 5 | 3 |
| 5th Decile | 23 | 3 | 2 |
| 6th Decile | 5 | 0 | 0 |
| 7th Decile | 7 | 1 | 1 |
| 8th Decile | 8 | 0 | 0 |
| 9th Decile | 3 | 0 | 0 |
| Bottom Decile | 0 | 0 | 0 |
| None given | 24 | 13 | 8 |
| Total | 364 | 133 | 99 |

## 4. College Board Scholastic Aptitude Test

SAT–*VERBAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 17 | 15 | 10 |
| 700-749 | 133 | 107 | 65 |
| 650-699 | 333 | 177 | 111 |
| 600-649 | 374 | 127 | 93 |
| 550-599 | 322 | 39 | 29 |
| 500-549 | 240 | 17 | 14 |
| 450-499 | 140 | 5 | 1 |
| 400-449 | 51 | 1 | 1 |
| 350-399 | 19 | 1 | 0 |
| Below 349 | 12 | 0 | 0 |
| Not given | 23 | 0 | 0 |
| Total | 1664 | 489 | 324 |

SAT–*MATHEMATICAL*

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 18 | 15 | 7 |
| 700-749 | 139 | 107 | 63 |
| 650-699 | 261 | 139 | 95 |
| 600-649 | 329 | 106 | 81 |
| 550-599 | 353 | 72 | 46 |
| 500-549 | 277 | 31 | 20 |
| 450-499 | 171 | 13 | 11 |
| 400-449 | 71 | 3 | 1 |
| 350-399 | 14 | 1 | 0 |
| Below 349 | 6 | 0 | 0 |
| Not given | 23 | 0 | 0 |
| Total | 1664 | 489 | 324 |

## 5. Scholastic Aptitude Test Mean Scores of Matriculated Freshmen

| | | | |
|---|---|---|---|
| Verbal | 655 | Math | 642 |

## 6. College Board Achievement Test in English Composition

| *Score Range* | *Total Applicants* | *Applicants Accepted* | *Matriculated Class* |
|---|---|---|---|
| 750-800 | 42 | 36 | 28 |
| 700-749 | 120 | 94 | 56 |
| 650-699 | 320 | 162 | 100 |
| 600-649 | 398 | 133 | 93 |
| 550-599 | 329 | 36 | 29 |
| 500-549 | 223 | 19 | 14 |
| 450-499 | 111 | 7 | 4 |
| 400-449 | 53 | 2 | 0 |
| 350-399 | 20 | 0 | 0 |
| Below 349 | 5 | 0 | 0 |
| Not given | 47 | 0 | 0 |
| Total | 1664 | 489 | 324 |

## 7. College Board English Composition Achievement Test Mean Score of Matriculated Freshmen

659

## 8. Geographical Distribution of Matriculated Freshmen

| | | | |
|---|---|---|---|
| Alabama | 2 | Missouri | 3 |
| California | 2 | Nebraska | 1 |
| Colorado | 2 | Nevada | 1 |
| Connecticut | 2 | New Hampshire | 1 |
| Delaware | 2 | New Jersey | 15 |
| District of Columbia | 3 | New Mexico | 2 |
| Florida | 30 | New York | 19 |
| Georgia | 15 | North Carolina | 76 |
| Hawaii | 1 | Ohio | 14 |
| Idaho | 1 | Oklahoma | 1 |
| Illinois | 11 | Pennsylvania | 12 |
| Indiana | 2 | South Carolina | 12 |
| Iowa | 1 | Tennessee | 7 |
| Kentucky | 2 | Texas | 12 |
| Louisiana | 3 | Virginia | 33 |
| Maryland | 14 | Wisconsin | 1 |
| Massachusetts | 3 | Wyoming | 1 |
| Michigan | 3 | Outside U. S. | 7 |
| Mississippi | 3 | Total | 324 |

## 9. Alumni Daughters

| | | |
|---|---|---|
| Applied | 112 | |
| Accepted | 46 | (41% of daughters applying) |
| Matriculated | 26 | (57% of those accepted) |

BULLETIN OF DUKE UNIVERSITY

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Duke Station Durham, N. C.

Return Postage Guaranteed

# Studying Law at Duke



BULLETIN OF DUKE UNIVERSITY

"I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines, is, next to religion, the greatest civilizing influence. I request that this institution secure for its officers, trustees and faculty men of such outstanding character, ability and vision as will insure its attaining and maintaining a place of real leadership in the educational world, and that great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination and application evincing a wholesome and real ambition for life. **And I advise that the courses at this institution be arranged, first, with special reference to the training of preachers, teachers, lawyers and physicians, because these are most in the public eye, and by precept and example can do most to uplift mankind, . . .**"

(From the Indenture of James B. Duke)

# Studying Law at Duke



The Duke Chapel, in the heart of the Gothic Campus, is an outstanding monument of its kind.

**Bulletin of Duke University**

**Volume 37** **September 1964** **Number 2-A**

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*Are You Considering*

# The Study of Law?

IF you have ambition, intelligence and confidence in your ability to succeed, probably you have already thought of studying law, especially if you aspire to rewards beyond those merely financial. Few careers offer greater satisfaction than success in the law.

The study of law is *not* for those seeking great wealth with little effort. It *is* a career for those of superior ability and character who are willing to reap in proportion to their efforts.

If law is taught in the "grand manner," it provides a liberal education one that cuts across so many fields of human activity and human relation that those who pursue it may approach that Renaissance ideal of the "Universal Man."

The study of law leads to many diverse opportunities. For some careers it is the means of entry. For



The spot-lighted Chapel at night is a dramatic and inspiring sight.

Turn this page for a look at a typical Duke Law School entering class.

(We try to limit entering classes to 100 students, but this one had a few more)

33% from the norteastern states
30% from the southern states
26% from the middle western states
11% from the far western states

ners it is a stepping stone to more pid advancement.

Perhaps already you have decided practice law, or perhaps you are king a career in government, with large corporation or in a family ned business, in education or in nmunications. Duke law gradus include leaders in all of these ds.

F YOU like to help people, if you can be constructive in dealing h problems, troubles, and dilems, then you may do well to con- er the law as a profession. Help- people is a lawyer's daily work, ving problems his professional ponsibility, and trouble the reason his existence.

Law offers opportunities to people varied talents, so heterogeneous is practice. You may have no ent for courtroom dramatics, and you may succeed as a tax special- estate planner, or organiza- nal strategist. If you are excellent at written argument but less adept at oral argument, you can still fit effectively into a partnership team. There are many different kinds of practices and specialities. Civil and criminal litigation, corporation law, estate law, taxation and labor relations are but a few. There are many sizes of law offices from the one-man office to those with over one hundred lawyers. If you possess the basic qualifications, then somewhere there is a place that will suit your temperament and ability.

A good lawyer will find his earnings growing each year. Unlike other pursuits, where peak earning power may be reached at the age of 35, a lawyer will find his earnings much greater at 45, better still at 55, and still growing at 65, if he chooses to remain active.

Yes, the legal profession offers you a challenge and a great opportunity. Duke University School of Law offers a chance to seek and meet that opportunity.







Moot court trials give practice in courtroom give and take.

*Do You Have*

# A Lawyer's Qualifications?

Some of the qualities that a lawyer must possess have already been touched upon. There are others.

"Talk, talk, talk! Why, this boy talks so much that, I declare, he ought to be a lawyer." This is a crude conception, unfortunately all too prevalent, of the qualifications for a lawyer. Members of the profession are apt to overhear such remarks with mingled amusement and resentment.

True, if you are going to be a lawyer you should be articulate, but this does not mean garrulous. You should be articulate with pen as well as with the spoken word. The law is no profession for the illiterate. The ability to express oneself with a few intelligently chosen words, selected after solid analysis and grammatically and artistically presented, is a great asset. This involves the ability to read intelligently, because a lawyer constantly turns to legal literature (and non-legal as well) for information and ideas. A limited vocabulary is a handicap.

It is needless to say that another prime requisite is the ability to think clearly.

Every leading lawyer with whom you will ever talk will also emphasize this point: character and integrity lead the list of virtues that a lawyer must possess. The young lawyer from the very beginning must so conduct himself that no breath of suspicion can be associated with his conduct. He will be observed by everyone, and in particular by other lawyers. One wrong ethical move at the start of his career and he is immediately pigeonholed as a man to bear watching, not to be trusted. Such a reputation is a tremendous handicap to success and satisfaction in any field and particularly so in law. One of the lawyer's greatest assets is his ability to inspire confidence. When a client leaves the office, that client should say to himself: "I know that my problem is in honest, capable and conscientious hands."

Naturally, personal appearance, dress, speech and manners have a definite bearing on inspiring confidence.

Finally, you should know that the willingness and ability to work hard is essential. If you aspire to the 25-hour week, don't be a lawyer. For one thing, no respectable lawyer would want to work that little—law practice is too interesting. Good, solid, hard work counts for more in the long run than occasional flashes of genius. If, on assessing yourself, you conclude that you are not "brilliant," that does not necessarily mean that you cannot be a successful lawyer. Many a "genius" has been surpassed in the practice of law by others less brilliant but with more of the prosaic virtues, including plain horse sense and good judgment.



On Television—Seated on stage at the Caspary Auditorium of The Rockefeller Institute, members of "The Great Challenge," symposium "The Changing Patterns of our Political System": **Arthur Larson, Director of World Rule of Law Center, Duke Law School;** Dr. Richard Neustadt, Professor of Government, Columbia University; Senator Barry M. Goldwater, R-Arizona; Governor Michael V. DiSalle of Ohio; Richard Rovere, correspondent for The New Yorker Magazine; moderator Howard K. Smith, CBS News Washington Correspondent.

*How Should You*

# Prepare for Law School?

What college courses should you take if you are going to law school?

One can point to no single course in college and say that *that* is a "must" in pre-law study. Nor can one say that there is any single "major" which opens the way for success in law study or law practice. Success has been achieved in law school and in law practice by students who have majored in mathematics, English, history, economics, philosophy, political science, Latin, foreign languages, the physical sciences, and even those with degrees in engineering or business administration.

In general, if you are going to law school, you can afford to pass up those courses which include the word "law" in their names, but this statement does not apply to college courses in constitutional law or international law when studied from the point of view of the political scientist.

Take the tough courses in college, those that make you think and work. Avoid the "snap" courses.

In general, avoid the "vocational" courses. Stick to the fields which traditionally have been looked upon as the mark of the educated man. You will recognize them among those fields already mentioned, although they are by no means limited to those fields. Mathe-

Classroom wing of new Law Building.





Section of Library Reading Room, new Law Building.

matics encourages you to think logically. English courses should help you to become articulate and literate—especially, some say, the English writing courses. Latin and modern languages instill discipline and accuracy—and incidentally teach you a great deal about your own language. History, putting you in contact with the culture and achievements of the ages, enables you to understand your heritage and assess current institutions. Philosophy challenges you to inquire, question, speculate. Political science, economics and sociology broaden your horizon, make you better able to appreciate the world in which you live. None of these subjects will make you a technician who, as such, can sell his services for a higher price. But you will be a better practitioner in the learned professions for having chosen them over the vocational courses. (Accounting, properly taught, can well be part of a liberal education.)

## Selecting Your Law School

Any attempt to classify law schools is inherently arbitrary and is bound to be far from definitive. It is, however, customary to regard the better schools as either "national" or "state" and as large or small. This disregards those unaccredited schools, not affiliated with any strong university, which frequently are operated merely as profit-making ventures and do not merit your consideration. In this connection it should be emphasized that law is a profession in which only the superior practitioner stands a high chance of success, and you should not handicap yourself with an inferior legal education.

Although any sacrifice is worth making to attend one of the best schools, paradoxically the best often costs the least for the superior student eligible for financial aid.

A national law school is one whose student body is not predominantly from the state in which it is located. This in turn means that the sphere of the school extends beyond the state. A by-product is that its graduates are pretty well scattered over the nation.

The Duke Law School is in the "national" group and, accordingly, its instruction is directed to the legal principles that underlie what lawyers and judges do in all sections of our country and elsewhere in the common law world, i.e., the British Commonwealth. (And often in other countries.) One might be led to believe that a local law school better prepares its students for success in local law practice. Actually, the evidence does not support such belief. One advantage of the national law school is that its graduates enjoy a wide market where it comes to making professional connections upon graduation.

The distinction between the "large" and the "small" law school relates mainly to the number of law students. Each type of school has certain advantages. The mass production and cold impersonality of the large schools, it can be argued, provide good preparation for what you can expect in our mass urban civilization. Arguably, students at such a school learn from each other by a cross fertilization of many minds. In fact, however, a student gets to know only a few other students at such a place and they tend to form small groups; the cross-fertilization, except in the class room, is thus within a very limited group after all. And in the large class room, the students at the back of the room may get very little benefit from a discussion going on be-



The dean cor
regularly with
student—here
employment opp
nities, but often
many other th



formal discussion in small class: Professor O'Neal's Corporate anning seminar.

tween the professor and a student in the front row. In the smaller law school, you get to know every man in your class and frequently most of the students in the other classes—or at least you get the chance to do so if you make the effort. You feel free to start a legal argument any time, with any one of them. In the smaller law school you can get to know your professors; your professors can get to know you.

You can acquire a very good legal education at either a top-flight large school or a top-flight small school. It is largely a question of suiting your taste and temperament.

One warning to you, however: Discount the lavish praise that you will always hear of each and every law school within a radius of a few miles from its location! For some inexplicable reason an intense provincialism exists with respect to law schools. You will be solemnly told, within this radius, that here is the greatest law school in the world, or at the least it may be grudgingly conceded that it is number two. If you ask a lawyer, he will tell you that the institution which he attended is the greatest of them all. Lawyers can be helpful to you in your selection of a law school if you will just make it clear to them that their alma mater is to be left out of the discussion.

*and*

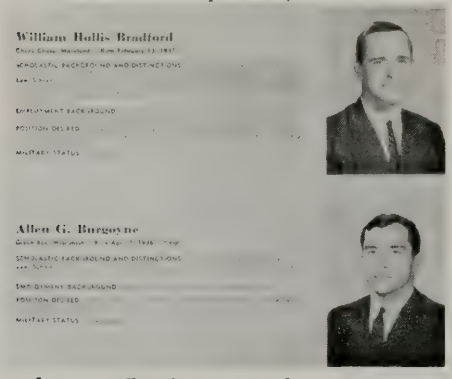
# After Duke Law School, Then What?

Placement of its students is one of Duke Law School's most successful achievements. Close contact is kept by the Dean and the Assistant Dean with outstanding law firms over the country.

Notwithstanding the many other opportunities available to Duke Law students upon graduation, they seem to prefer the private practice of law. Their preferences in this respect run to the law firms in the larger cities of the nation and include all major geographical areas. The national distribution of the School's graduates in large measure reflects the wide geographical sources of the incoming students.

Naturally, a student who stands high in his class finds himself in more of a "seller's market" than one who stands low, other factors being equal. (Which they never are.) Even so, we are constantly gratified at how far down a Duke Law School class the top flight law firms of every region are willing to go for young and promising legal talent.

Duke was the first law school to initiate the *placement bulletin,* an idea since adopted by a number of other schools. The *placement bulletin,* which is under the editorial supervision of the students themselves, lists the members of the senior class with their pictures and relevant biographical data. (A representative page from that bulletin is here reproduced.) The placement bulletin is widely circulated among law offices, government offices and business offices and has proved to be an effective part of our placement program.


William Hollis Bradford

Allen G. Burgoyne

Most of the placement activity is in the third year, but we also cooperate fully with the students in canvassing potentials for the so-called "summer internship," for the summer following the second year of law study.

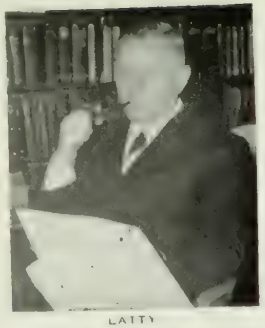


Principal participants in the 1963 Law Day-Dedication exercises: Provost R. Taylor Cole; Professor Walter Gellhorn, President of the Association of American Law Schools; Mr. Charles S. Rhyne, former President, American Bar Association; Chief Justice Earl Warren; Senator John Sherman Cooper; Solicitor General Archibald Cox; and Dean Latty.

Duke Law School celebrates its annual Law Day on a weekend close to the National Law Day U. S. A. The Duke Bar Association plays an important role in planning and carrying out the program of activities for the occasion. Speakers of national prominence and panel discussions of topics of importance to the profession typically are features of the celebration.

A panel of taxation law experts from various sections of the country, all Duke Law graduates, discuss strategy and tactics in tax cases for an audience composed of Duke Law students as well as practicing lawyers from far and wide. Left to right: Hugh G. Isley '53, J. Carlton Fleming '51, Leon L. Rice '36, and Numa L. Smith '41.





LATTY

ELVIN R. LATTY, B.S., Bowdoin College; J.D., University of Michigan; J.Sc.D., Columbia University; general practice, 1930-1933; Associate Professor of Law, University of Kansas, 1934-1935; Professor of Law, University of Missouri, 1935-1937; Special Assistant to the American Ambassador, Caracas, 1942-1943; Acting Assistant Chief, Foreign Funds Control Division, Department of State, 1943; Fulbright Lecturer, University of Pavia (Italy) 1954; Faculty since 1937, and Dean.



BAADE

HANS W. BAADE, A.B., Syracuse University; Dr. iur. 1951, University of Kiel, Germany; LL.B., LL.M., 1955, Duke University; Diploma, 1956, Hague Academy of International Law. *Assistent*, 1955, and *Referent*, 1956-59, Institute of International Law at the University of Kiel, Germany; Editorial Secretary, Jahrbuch für Internationales Recht; Faculty since 1960.



BOLICH

W. BRYAN BOLICH, A.B., Duke University; B.A. (Juris.), B.C.L., M.A., Oxford University; general practice 1924-1927; Legal Attaché, American Embassy, Rome, 1950; Faculty since 1927.



BRYSON

EDWIN C. BRYSON, University of North Carolina, 1922-1925; Duke University, 1932-1933; LL.B., University of Oregon; general practice, 1927-1930; Duke University Counsel since 1945; Faculty since 1947.

# The Law Faculty at Duke University

An outstanding faculty of efficient size and a student body of high quality are the hallmarks of a fine law school. Besides maintaining a high ratio of law faculty to students, with emphasis placed on individualized instruction, the Duke Law School has been unusually fortunate in attracting a faculty of outstanding quality and reputation. The brief biographical faculty data here shown, which does not include their long list of published writings, or their scholastic honors (ex., Phi Beta Kappa, summa cum laude, Rhodes Scholarships, etc.), indicate the unusually high qualifications of the present faculty.

The aggregate law practice experience of these members of the faculty has been varied and extensive.

BRAINERD CURRIE, A.B., LL.B., Mercer University; LL.M., J.Sc.D., Columbia University; Instructor in Law, Mercer University, 1935-37; Assistant Professor of Law, Wake Forest College, 1937-41; Associate Professor of Law, University of Georgia, 1941-42; Professor of Law, Duke University, 1946-49; Professor of Law, University of California, Los Angeles, 1949-52; Dean and Professor of Law, University of Pittsburgh, 1952-53; Professor of Law, University of Chicago, 1953-61; Faculty since 1961.



CURRIE

ROBINSON O. EVERETT, A.B., LL.B., Harvard University; U.S.A.F., 1951-1953; Commissioner, U. S. Court of Military Appeals, 1953-1955; General practice, Durham, N. C. and Washington, D. C.; Faculty 1950-1951 and since 1956.



EVERETT

PAUL HARDIN III, A.B., LL.B., Duke University; general practice, 1954; Military Service, United States Army Intelligence, 1954-56; general practice 1956-58; legal studies and researches, University of Edinburgh, summer 1962 (Ford Foundation Grant.) Faculty since 1958.



HARDIN

CLARK C. HAVIGHURST, A.B., Princeton University; J.D., Northwestern University; Military Service, 1958-60; Research Associate, Small Business Studies, Duke University, 1960-61; private practice, 1961-64; Faculty since 1964.

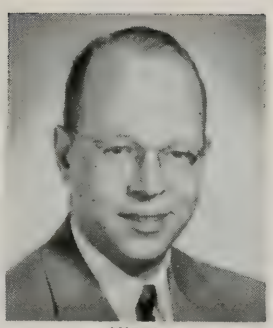


HAVIGHURST

## Faculty
## niversity

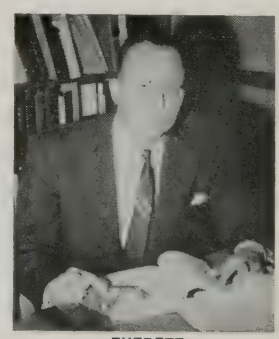
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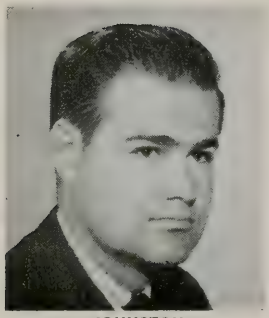


HARDIN

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HAVIGHURST



JOHNSTON

JOHN D. JOHNSTON, JR., A.B., LL.B., Duke University; with J. P. Morgan Co., New York City, 1956-58. General Practice in Asheville, N. C., 1958-62; Faculty since 1962, and Assistant Dean.



LARSON

ARTHUR LARSON, A.B., LL.D., Augustana College; M.A. (Jurisp.), B.C.L., Oxford University; Fellow of Pembroke College, Oxford; Gen. Prac. 1935-39; Ass't Prof. of Law, Univ. of Tenn., 1939-41; Division Counsel, Office of Price Administration, 1941-44; Chief, Scandinavian Branch, Foreign Economic Administration, 1944-45; Assoc. Prof. and Prof. of Law, Cornell Univ. 1945-53; Fulbright Fellowship, London School of Economics, 1952: Dean, Univ. Pittsburgh Law School, 1933-54; Under Secretary of Labor, 1954-56; Director, U. S. Information Agency, 1956-57; Spec. Ass't to the President of the United States, 1957-58; Faculty and Director World Rule of Law Center since 1958.



LIVENGOOD

CHARLES H. LIVENGOOD, JR., A.B., Duke University; LL.B., Harvard University; general practice 1934-1940; Regional Attorney for the Seventh Region, Wage and Hour Division, U. S. Department of Labor, 1940-1941; Chief of the Wage-Hour Section, Office of the Solicitor of Labor, 1941-1942: general practice, 1945-1948; visiting prof. of law, Univ. of Sydney 1958; Faculty since 1948.



LOWNDES

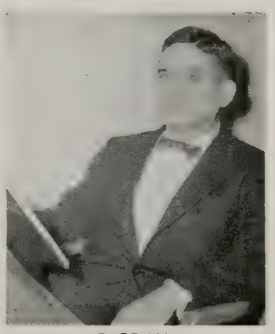
CHARLES L. B. LOWNDES, A.B., Georgetown University; LL.B., S.J.D., Harvard University; general practice 1926-1927; Assistant Professor of Law, Georgetown University, 1927-1928; Professor of Law, Georgetown University, 1928-1930, 1931-1934; Faculty since 1934.

F. HODGE O'NEAL, A.B., LL.B., Louisiana State University; J.S.D., 1949, Yale University; S.J.D., 1954, Harvard University; Associate Professor of Law, University of Mississippi, 1945-46; Professor of Law, University of Mississippi, 1946-47; Acting Dean and Professor of Law, Walter F. George School of Law, Mercer University, 1948-56; Professor of Law, Vanderbilt University, 1956-59; Visiting Professor of Law, New York University, 1957-58; Faculty since 1959.



O'NEAL

JOEL FRANCIS PASCHAL, A.B., LL.B., M.A., Wake Forest College; Ph.D., Princeton University; Instructor in Law, Wake Forest College, 1939-1940; U.S.N.R., 1942-1946; Instructor, Princeton University, 1946-1947; Research Director, North Carolina Commission for the Improvement of the Administration of Justice, 1947-1949; general practice, 1949-1954; Visiting Professor of Law, Duke University, 1952-1953; Faculty since 1954.



PASCHAL

MELVIN G. SHIMM, A.B., Columbia University; LL.B., Yale University; 2nd Lt., FA (AUS), 1943-1946; general practice, 1950-1951; Counsel, Wage Stabilization Board, 1951-1952; Bigelow Fellow, University of Chicago Law School, 1952-1953; Faculty since 1953.



SHIMM

LAWRENCE G. WALLACE, A.B., M.P.A. (Master of Public Administration), Syracuse University; U. S. Air Force, 1953-55; Staff, Maxwell Graduate School, Syracuse University, 1956; LL.B. 1959, Columbia University; Associate, Covington & Burling, Washington, D. C., 1959-60; Law Clerk to Mr. Justice Black, U. S. Supreme Court, 1960-61; Faculty since 1961.



WALLACE

*Some Further Notes On*

# The Duke Law School

The Duke Law School is a national school and, as national law schools go, a small school. Its ratio of faculty to students is among the highest of the leading law schools and so is its faculty compensation scale. This means that the annual amount which Duke spends per student in giving legal education is, again, among the highest in the nation.

To conduct a school of law with a high calibre faculty of national and international note costs money. Duke law students, however, do not carry the burden of that expense; fortunately a generous endowment, although not autonomous to the law school, carries much of the burden. The student's tuition pays only a fraction of the cost of giving him a legal education.

A law school of Duke's size is particularly well adapted to teach by the "case system" which prevails in this country. This involves teaching by Socratic discussion between student and instructor of actual and hypothetical cases, rather than by lectures which purport to set forth legal precepts in dogmatic fashion. We have managed to keep classes small enough to permit general participation in the student-instructor discussion. However, you must be prepared to find some law classes larger than many classes in the fine small colleges.

There are schools where a student, if he wants to discuss a point with the professor, must make an appointment two weeks in advance. At Duke a student simply appears before his professor's door (usually open) and asks: "Are you busy, Sir?". He may expect a reply: "Yes, I'm busy, but come in and let's see what's troubling you."

Although fully aware that a good lawyer must be a "practical" man who can do things (and not just think about them), legal education at Duke does not over-stress the practical. Beware of claims of practicality. Too often, in education, emphasis on practicality is the earmark of intellectual poverty and cultural barrenness. Law school is no place to learn how to fold legal documents or to learn law office management. A superior law school education is basically a *liberal* education in law. The type of training given at Duke Law

School not only gets the young law graduate off to a fast start in his professional career but also stands him in good stead later on.

## The Program of Instruction

It takes three years of study (six semesters) to get the LL.B. degree. Duke maintains no summer school for law. If a Duke law student is determined to shorten the period of three years, he will be permitted, upon consultation with the Dean, to take summer courses at other approved law schools. Thereby he may finish in January of his senior year, instead of the following June. In general, however, the continuous study of law unrelieved by summer vacation is not recommended.

Duke Law School, like others, has had to face this problem in recent years: twenty-five years ago it took three years to complete the law school study; today it still takes three years despite the fact that within the past quarter century the law has grown tremendously in complexity, particularly in fields like Constitutional Law, Labor Law, Administrative Law, Business Regulation, Corporation Finance, International Law; how, then, to fit the law students for law practice in the same period of time? Constant revision in courses, content and method at Duke Law School has not only gone far to solve that problem but has at the same time, while retaining the so-called "case-method" as its basic technique of instruction, improved upon those older teaching methods which have at times led to criticism of law schools by the active Bar.

## The Graduate Program

Since this brochure is intended primarily for those who are thinking about the basic legal training in preparation for the bar, description of the program looking to the advanced degrees of Master



A Duke professor's door is always open to his students. Professor Lowndes, nationally known tax law expert, clears a point for a student.

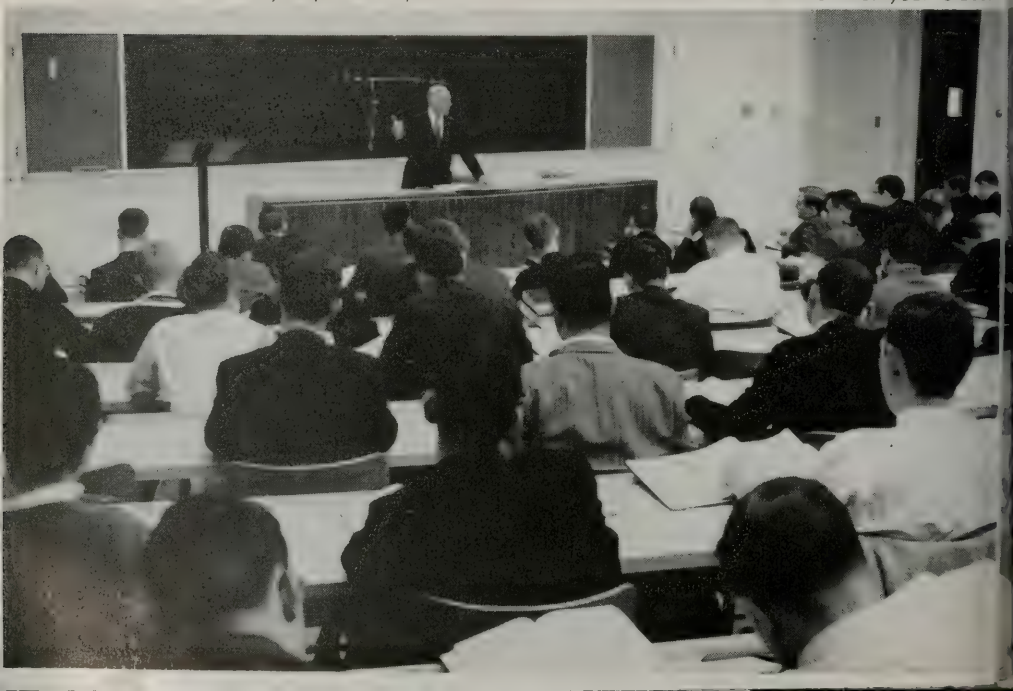
of Laws, Master of Comparative Law and Doctor of Juridical Science is omitted. Information can be obtained by writing to the Dean.

## Facilities

In September, 1962 the Law School moved into its new building, which was formally dedicated on April 27, 1963. This new home for the School, just off the Gothic-style core of the Campus, is of more modern design, material and construction, although in keeping with its surroundings. It consists of a classroom wing and a Library and Administration wing, with faculty offices in both wings. The classroom wing also houses the World Rule of Law Center, as well as Small Business Researches. The library is unusually spacious in its reading room in relation to the size of the student body and is similarly spacious for book stacks and interspersed reading tables. The combined seating capacity in the library's main reading room, carrels and inter-stack tables can easily accommodate the entire student body at one sitting. So can the classrooms, not to speak of the numerous seminar, conference and lounge rooms. In addition, the new Court Room can hold almost the entire present student body. Student lockers and vending machines are conveniently located.

Plans are also under consideration for new living accommodations for unmarried law students, to be located next to this new building. These would fittingly supplement the recently built married student housing facilities, which are also situated near the new law building.

Dean Latty explains a point of Business Associations law to the first year class.





A Law Lounge offers a place for studying or a quiet conversation. The new Law Building has a number of lounges.

*Yes but*

# Can I Afford the Duke Law School? And Can I Get in?

Don't be dismayed by tall tales that at X Law School they turn down nine for every one who gets in. The truth is, rarely does any law school turn down as many as three out of four applicants, and there are not many law schools that turn down as many as two out of three applicants.

At any law school, your chances of getting in are good if you are above or only a bit below the average or median of the last entering class in either college record or LSAT score. If you are below in both, you can expect difficulty. However, admission is often a complicated process, not just a question of adding up your college record and LSAT score. Geographical representation, college representation, a sense of obligation to the region, an urge to experiment with varying combinations (e.g., a magna cum laude applicant with a LSAT score in the 400's; a 700 LSAT scorer with a "disinterested" college record and a blind spot in French), choice of leader-achiever type as against the back-room researcher, the Admission Officers' guess about next month's ratio of acceptances to offers—all these enter into the picture.

Most students entering Duke Law School were on the Dean's List in college, and most had LSAT scores (morning) above 600. Those rare few who have come in with LSAT scores in the 400's more than made up for it with some outstanding achievement, e.g., Phi Beta Kappa. Although we are still experimenting with the balance between college records and LSAT scores, we are about ready to concede that the applicant with LSAT scores in the 95 percentile who is in the bottom quarter of his class in college is a poor bet.

Increasingly, applicants are taking the test in November of their Senior year in preference to tests later in the year.

We try to limit our entering class to 100. We suggest that applicants get their application in by February 15.

## Scholarships and Loans

Financial aid is available, sometimes by scholarship without loan, sometimes by loan without scholarship, often by a combination of the two.

As between applicants of substantially equal caliber, we are forced to give preference in admission to those not seeking scholarship. If a student intends to apply for scholarship, we prefer to receive that application with the application for admission.

Except for a few scholarships based purely on merit, scholarships are for those who combine genuine and serious financial need with records and scores well above the class median. Contrary to the postulates of the classical economists, in the field of scholarships supply *never* equals demand. Realistic scholarship applicants recognize this imbalance and are prepared to yield to the needier applicant.

Sometimes the applicant offered a loan says he doesn't want to start off in life with a debt load. Actually, indebtedness for legal education should be viewed as a sound investment.

Depending on the funds available, loans are either on the generous terms of the National Student Loans (no interest accrues until one year out, then at 3 per cent, repayment thereafter over a 10-year period) or on terms only a bit less generous (1 per cent until graduation, then at 3 per cent, then 6 per cent after 5 years) or on purely commercial terms arranged through a bank.

EXPENSES

The typical basic expenses for a Duke law student for an academic year are:

| | |
|---|---|
| Tuition | $1200 |
| Rooms (two in room) | 250 |
| *Board | 550 |
| *Books and Supplies | 125 |
| *Laundry | 60 |
| | $2185 |
| Travel | ? |

*Moderate estimate

Naturally, the total figure will vary for the individual student, particularly the travel item.

## Job Opportunities While in School

It is not advisable for a law student to attempt any substantial amount of outside work. Nevertheless, a student who is highly efficient in the use of his time can, by saving minutes that others waste, devote some of them to supplementing his other financial resources. A number of positions in the Law Library are filled by law students. Outstanding students (second and third year) are often employed to assist faculty members. The University maintains an office to aid students in finding employment, and many of the available jobs go to law students, since as a group they have proven their reliability over the years.

If you are married and your wife can teach school or do secretarial or nursing work, the opportunities for employment in the region in which the School is located are very good. Other employment opportunities are of course available. Of recent years, between one third and one half of the Duke law students have been married. Many of them have been able to pursue their law studies by virtue of the fact that their wives, if unburdened by small children, can hold jobs.

# Some General Information

## World Rule of Law Center

A few years ago the Duke Law School established its World Rule of Law Center, with Professor Arthur Larson as its Director.

The purpose of this Center is to advance the objective of getting legal rules and procedures accepted and used in the settlement of international disputes, including disputes of a kind that threaten



The World Rule of Law Center staff in June, 1963: Mr. Halderman, Mr. Partan, Dr. Grzybowski, Dr. Larson, Dr. McClure, Mr. Nawaz, Mr. Crane, Mr. Liacouras

world peace. It aims to do this by maintaining a nucleus and clearing house for ideas, activities, and research that will advance this aim.

The Center has produced significant researches and publications. The establishment of the Center has broadened the range of international studies and researches available to Duke law students having particular interest in this area.

## Publications

*Law and Contemporary Problems*

For over a quarter-century the Duke Law School has published four times a year *Law and Contemporary Problems,* a unique legal periodical which was originated with the underlying philosophy that to understand intelligently the role that law plays in any transaction or institution, one must also know the non-legal factors involved. These factors may be business matters or sociological, political or administrative matters. Accordingly, each issue is devoted to a symposium consisting of a number of articles, each of which is written by an expert in that particular field, legal or non-legal. Here are illustrative titles of recent symposia: Securities Regulation, Government Contracts, Jurimetrics, Academic Freedom, and The Soviet Impact On International Law. Here again the Duke Law School has pioneered. Despite imitators, *Law and Contemporary Problems* remains a unique and outstanding institution among the world's legal publications. Many issues have been used as texts in college and graduate school courses.

*The Duke Law Journal*

It has been the constant aim of the Law School to develop the capacity in its students to do superior legal writing, which is an indispensable requisite for a good lawyer. Not only is this objective emphasized in the program of instruction itself, but the students are also provided with a vehicle for the publication of their efforts. Appearing quarterly the *Duke Law Journal* contains student commentaries on currently significant legal problems. Election to Editorial Board membership is based solely on merit.

*The Journal of Legal Education;* the *Corporate Practice Commentator*

Both of these well-known legal periodicals have their editorial offices at Duke Law School, under the editorship of Professor John D Johnston and Professor F. Hodge O'Neal, respectively.

## The Duke Bar Association

Professional, social, and other extra-curricula activities of the law school are conducted by the students themselves through the medium of the Duke Bar Association. This organization, which includes all the students in the Law School, is similar in composition and purpose both to a university student government and to a professiona

bar association of the kind to which you will belong as a practicing lawyer. It is also the center of the Law School's non-academic life.

The Association through its various committees carries on a wide variety of functions, including publishing the seniors' *Placement Bulletin,* assisting in moot court competitions, publicizing the activities of the Law School and of the individual students, procuring speakers of interest from the outside and providing well rounded athletic and social programs. The Association also administers the Law School Honor Code through an elected Judicial Board.

## The Duke International Law Society

The internationally-minded law student can find at Duke Law School considerable to challenge him: formal courses in legal aspects of international affairs, the World Rule of Law Center, the World Law section of the Duke Law Journal and the Duke International Law Society. The latter, a charter member (with the law schools of Columbia, Harvard, Virginia and Yale) of the Association of Student International Law Societies, has a program of researches, of participation in international moot court competitions and in conferences relating to international law, of engaging speakers in that field, and related activities. A substantial percentage of the Duke law students belong to the Society.

## Law Living Quarters

Although some law students desire to live off campus, the great majority of the non-married students live in the Men's Graduate Living Center. Here they reside with students from the School of Medi-



The Woman's College (1200 undergraduates) with its own nearby campus and distinctive architecture is autonomous, yet an integral part of Duke University.

cine, the Graduate School of Arts and Sciences, the Divinity School, and the School of Forestry.

This Center, in addition to providing comfortable living quarters for 400 graduate and professional students, has its own dining rooms, lounges, recreational halls and study rooms. A cosmopolitan atmosphere prevails, invigorating and beneficial to a young man preparing for a career in any field. This environment should be particularly valuable to future lawyers, who must acquire a broad outlook and an analytical perspective of other professions if they are to succeed in their own.

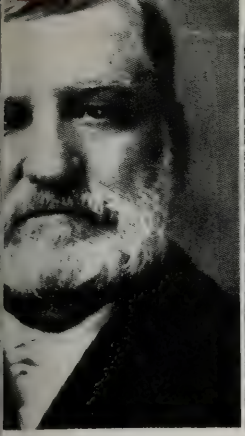
Housing for married students was completed in 1963. Rentals are $70-90 a month including heat, light, water. These units are in great demand. (First come, first served.) In addition, adequate facilities for married students are available off campus at similarly reasonable prices.



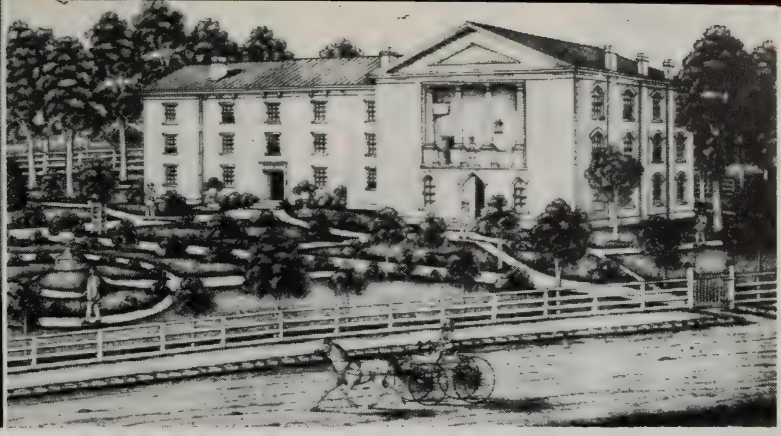
At left the main lounge and at right the coffee shop of the Men's Graduate Living Center.

# NOTES

# NOTES



ordecai (1904-1927)



Trinity College in Randolph County about 1860

# History of the Law School

Duke University is built around Trinity College, which goes back in its origin to the year 1838-1839, when Union Institute was founded. The teaching of law as part of a cultural education constituted the beginning of legal instruction in this institution in 1850. Professional education for law began in 1868 when the Department of Law of Trinity College was established.

The modern School of Law was founded in 1904 upon an endowment established by James B. and Benjamin N. Duke. Dr. Samuel Fox Mordecai, distinguished lawyer, scholar and teacher, organized the School and was its Dean until his death in 1927. The establishment of this School set a new standard in southern legal education, it being the first law school in the area to require the completion of two years of college work as an entrance requirement. The case method was used as the basis of instruction; and in this respect also the School was a pioneer in law-school method in this area. The completion of three years resident study was required for the LL.B. degree.

As a result of the foundation of Duke University in 1924, the School of Law has shared in the expansion incident thereto. In 1930, with the removal of the Law School to the newly completed Law Building, and the appointment of a greatly increased faculty and staff, the Law School entered upon a new stage. It was reorganized and the curriculum and professional activities much broadened, with the purpose of creating in this southeastern area a progressive law school of national scope and character.

Throughout its history the School has emphasized quality rather than quantity of student body.

Since the reorganization of the School in 1930, the following persons have served as Deans or Acting Deans: Justin Miller, 1930-1934; H. Claude Horack, 1934-1947; Harold Shepherd, 1947-1949; Charles L. B. Lowndes, 1949-1950; Joseph A. McClain, Jr., 1950-1956; Dale F. Stansbury, 1956-1957; Elvin R. Latty, since 1957.

Further Information may
be obtained from:

The Dean
School of Law
Duke University
Durham, N. C.

# BULLETIN

of

Duke University

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## COURSES IN DIVINITY SCHOOL

## DUKE UNIVERSITY SUMMER SESSION

1964

DURHAM, NORTH CAROLINA

**First Term: June 9—July 15**

**Second Term: July 16—Aug. 21**

*Volume 36* January, 1964 *Number 3*

# Calendar of the Summer Session 1964

June 8—Monday—9:00 A.M.
Dormitory rooms ready for occupancy

June 9—Tuesday
Registration for the First Term in Central Records Office, 103 Allen Building, 8:30 A.M.-1:00 P.M.

June 10—Wednesday
Instruction begins for First Term

July 14-15—Tuesday-Wednesday
Final examinations for First Term

July 16—Thursday—8:30-1:00
Registration for Second Term

July 17—Friday
Instruction begins for Second Term

August 20-21—Thursday-Friday
Final examinations for Second Term

All classes meet six days a week—Monday through Saturday. Classes will not meet, however, on Saturday, June 20; Saturday, July 4; Saturday, July 25; and Saturday, August 8.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

# Administrative Officers

DOUGLAS MAITLAND KNIGHT, Ph.D.
President of Duke University

ROBERT TAYLOR COLE, Ph.D.
Provost

FRANK TRAVER DE VYVER, Ph.D.
Vice Provost

OLAN LEE PETTY, Ph.D.
Director of the Summer Session

## *Advisory Committee on Courses in Religion*

ROBERT E. CUSHMAN, B.D., Ph.D.
Dean of the Divinity School

OSMOND KELLY INGRAM, (1959) B.D.
Dean of Students

HELEN MILDRED KENDALL, A.B.
Administrative Assistant and Registrar

WILLIAM ARTHUR KALE, (1952) B.D., D.D.
Director of Field Work

WALDO BEACH, B.D., Ph.D.
Director of Graduate Studies in Religion

## *Faculty*

JAMES MICHAEL EFIRD, (1962) B.D., Ph.D.
Assistant Professor of Biblical Studies

EGIL GRISLIS, (1959) B.D., Ph.D.
Assistant Professor of Historical Theology

HANS J. HILLERBRAND, (1959) Ph.D.
Assistant Professor of Modern European Christianity

OSMOND KELLY INGRAM, (1959) B.D.
Associate Professor of Applied Theology

CREIGHTON LACY, (1953) B.D., Ph.D.
Associate Professor of World Christianity

CHARLES K. ROBINSON, (1961) B.D., Ph.D.
Assistant Professor of Philosophical Theology

# Duke University Summer Session

THERE will be two terms of the Duke University Summer Session of 1964. The first term will begin on June 9 and end on July 15. The second term will begin on July 16 and end on August 21.

Courses in religion and related fields will be offered in the Duke University Summer Session. These courses are subject to all the regulations of the Duke University Summer Session as published in the Summer Session Bulletin. The undergraduate credits secured will count on the Bachelor of Arts degree. Divinity School credits will count on the Bachelor of Divinity, Master of Theology, and Master of Religious Education degrees. Graduate School credits will count on the Master of Arts and Doctor of Philosophy degrees. These credits may, of course, be transferred to other colleges, universities, and theological schools in the same way that such transfer of credit is usually made.

Candidates for degrees from Duke University shall be formally admitted to the school which will confer the degree. Candidates for the B.D. and M.R.E. degrees must be admitted to the Divinity School; candidates for the A.M. and Ph.D. degrees must be admitted to the Graduate School of Arts and Sciences.

## *Pre-Enrollment*

Students in residence at Duke University during the spring semester 1964 who plan to enroll for courses offered in the 1964 Summer Session will pre-enroll on the following dates:

The Divinity School
April 22-23

Students not in residence may pre-enroll by mail. Request for application blank should be made to the Summer Session Office, Duke University. Completed applications should be mailed to the Dean of the Divinity School, Duke University.

## *Registration*

Students in residence who have pre-enrolled on April 22 and 23 may complete their registration in the Summer Session Office on May 11-June 5. Advance registration in the Summer Session Office includes:

1. Completion of various Summer Session forms.

2. Payment of University fees.

Students not in residence at Duke University during the spring semester of 1964 whose applications are approved by the Dean of the Divinity School may complete registration by mail through June 5. Advance registration by mail with the Summer Session Office includes:

1. Completion in full and return of forms required by the Summer Session Office by June 5.

2. Payment of University fees by June 5.

Students who complete registration with the Summer Session Office on or before June 5 need not be present at the general registration on June 9. They will meet classes on June 10.

All Summer Session students whose classes begin on June 10, Term I, who *do not* complete registration in the Summer Session Office on or before June 5 *must* present themselves at general registration in Central Records Office, 103 Allen Building, on June 9 to register.

*Any student who fails to register on or before June 9, Term I, July 16, Term II, will be charged a fee of $5.00 for late registration.*

*All changes in courses other than those required by the University will require a payment of $1.00 for each change made.*

## *Fees and Expenses*

The University fee is as follows:

Covering registration, tuition and medical care $35.00 per semester hour.

One half of the above fee is rebated to students enrolled in the Divinity School, who will pay $17.50 per semester hour.

Applications for admission may be obtained from either the Divinity School Office or the Summer Session Office.

## *Room and Board*

In all dormitories the rate of room rent is $35.00, per term, for each student, where two students occupy a room. Single rooms are available at the rate of $41.25 for each term, but in limited numbers. Graduate and undergraduate students will be assigned to separate

residence halls in so far as is possible. The Divinity School and Housing Bureau will be glad to assist married students in locating accommodations for themselves and their families off the campus. Occupants of the University rooms furnish their own bed linen, blankets, pillows, and towels. Applications for rooms should be made to the Housing Bureau.

Board will be provided in the University cafeteria at approximately $72.00 for each term depending upon the needs and tastes of the individual.

## *Advanced Degrees*

The degrees of Bachelor of Divinity, Master of Theology, and Master of Religious Education are offered in the Divinity School.

The degrees offered in the Graduate School of Arts and Sciences are Master of Arts and Doctor of Philosophy.

Graduate study in religion leading to the degrees of Master of Arts and Doctor of Philosophy may be pursued in three fields: (1) Biblical Studies; (2) Studies in Church History; and (3) Studies in Christian Theology and Ethics.

Candidates for advanced degrees must be graduates of colleges of recognized standing.

Upon request the Director of the Summer Session or the Dean of the Divinity School will furnish bulletins containing detailed description of the academic requirements for the degrees of Bachelor of Divinity, Master of Theology, Master of Religious Education, Master of Arts, and Doctor of Philosophy.

## *Religious Services*

University religious services are held each Sunday morning at 11:00 o'clock in the University Chapel. All students are cordially invited to attend.

# The Summer Session of the Divinity School

## *Summer, 1964*

**Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.**

**FIRST TERM: (Registration on June 9—Classes begin on June 10)**

110 (DS). THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 11:00-12:20. 3 s.h. ROBINSON

120 (DS). FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles, the Nicene and the Chalcedonian Creeds in their contemporary setting. 7:40-9:00. 3 s.h. GRISLIS

337 (DS). THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 9:20-10:40. 3 s.h. HILLERBRAND

**SECOND TERM: (Registration on July 16—Classes begin on July 17)**

105 (DS). STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 7:40-9:00. 3 s.h. EFIRD

153 (DS). PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 9:20-10:40. 3 s.h. INGRAM

190 (DS). THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 11:00-12:20. 3 s.h. LACY

### SUMMER CLINICS

Three Clinics, Preaching, Pastoral Care, and Rural Church Work will be held simultaneously, July 20-31, 1964.

Costs: Registration Fee, $10. Tuition, $40. Board & Room.

All participants are eligible for Tuition Grants. In addition, Methodist Ministers in North Carolina may inquire about special grants provided by agencies of the Annual Conferences to cover costs.

Registration is open to ministers of all denominations.

No academic credit is given.

PREACHING: This is the seventh Clinic in Preaching to be held at Duke. Registration is limited to eighteen in number, preferably restricted to active ministers and chaplains who have been out of seminary five years or more. The clinic will concern itself mainly with principles of sermon construction and delivery, giving ample opportunity for the participants to preach for critique. Matters of common concern for preachers will be discussed in plenary sessions. For registration information write to Professor Thor Hall, Director.

PASTORAL CARE: The Clinic in Pastoral Care has as its theme the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences, aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the Chaplains to the Duke Medical Center forms an integral part of the program. For registration information write to Professor Richard A. Goodling, Director.

RURAL CHURCH: The Rural Church Clinic will consist of intensive training, study, and planning in the area of the church's responsibilities in the town and country community, giving particular emphasis to the development of an indigenous leadership. For registration information write to Professor M. Wilson Nesbitt, Director.

## The Methodist Course of Study School July 13-August 7, 1964

William Arthur Kale, *Director*, Box 4353, Duke Station
DURHAM, NORTH CAROLINA

The Methodist Course of Study School, the sixteenth session of the short term school for Methodist ministers taking the required Course of Study, will be conducted during the period, July 13-August 7, 1964. While this school is designed primarily for Supply Pastors and other non-seminary candidates for the Methodist ministry, clergymen of any denomination may enroll. The curriculum as approved by the 1960 Methodist General Conference will be followed, which will include Studies for License to Preach, Introductory Studies, and the Studies for the First, Second, Third, and Fourth Years.

In addition to class work, there is provision for daily worship in Duke Chapel and a number of special lectures and workshops. A varied program of recreation and athletics will be supervised by the University Department of Physical Education.

Registration is scheduled for July 13. Classes begin on the morning of July 14 and continue through August 7, including Saturdays. A descriptive folder giving details of the School will be ready for distribution about February 1, 1964, and copies may be procured by writing to Professor W. A. Kale, Director, Box 4353, Duke Station, Durham, N. C.

# BULLETIN

OF

# DUKE UNIVERSITY

# MARINE LABORATORY

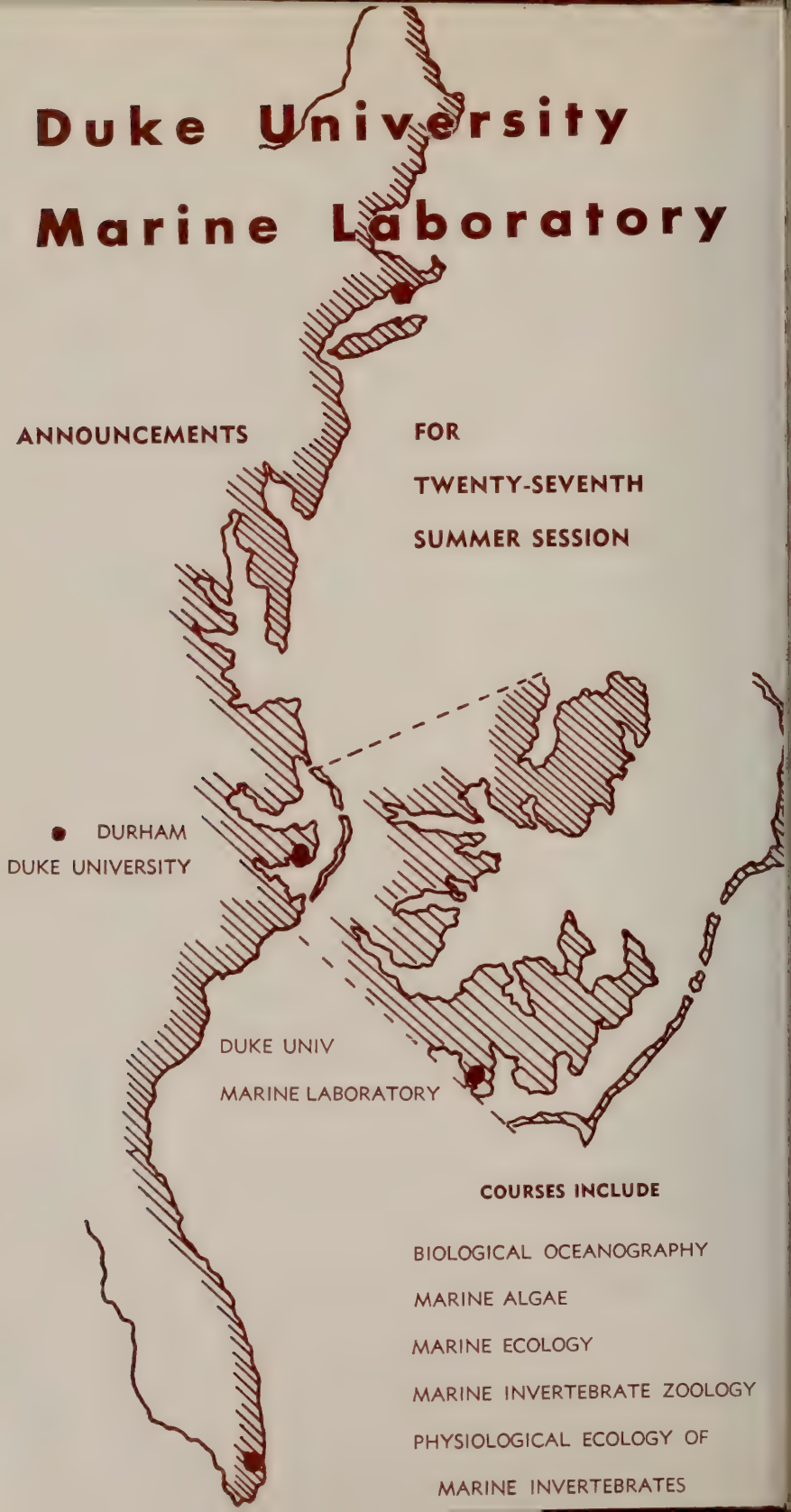
*Summer Session 1964*
*June 9-August 21*

BEAUFORT, NORTH CAROLINA

olume 36 January, 1964 No. 3-A

# Duke University Marine Laboratory

ANNOUNCEMENTS FOR TWENTY-SEVENTH SUMMER SESSION




**COURSES INCLUDE**

BIOLOGICAL OCEANOGRAPHY

MARINE ALGAE

MARINE ECOLOGY

MARINE INVERTEBRATE ZOOLOGY

PHYSIOLOGICAL ECOLOGY OF MARINE INVERTEBRATES

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PUBLISHED BY THE UNIVERSITY, DURHAM, NORTH CAROLINA
MONTHLY EXCEPT IN JULY, AUGUST, SEPTEMBER, AND DECEMBER

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## Duke University Marine Laboratory
## Advisory Committee

PHILIP HANDLER  EDWARD C. HORN  T. W. JOHNSON

## Administrative Staff

K. M. WILBUR, *Director*
F. J. VERNBERG, *Assistant Director*
R. M. ELY, *Business Manager*
R. J. MENZIES, *Oceanographic Program Director*

### Academic Staff

C. G. BOOKHOUT, Ph.D., Marine invertebrate embryology and invertebrate zoology
J. D. COSTLOW, Ph.D., Marine invertebrate embryology and experimental zoology
I. E. GRAY, Ph.D., Marine ecology and entomology
H. J. HUMM, Ph.D., Marine algae
WANDA S. HUNTER, Ph.D., Marine parasitology
T. W. JOHNSON, JR., Ph.D., Marine mycology
R. J. MENZIES, Ph.D., Biological oceanography, deep-sea fauna
F. J. VERNBERG, Ph.D., Physiological ecology of marine invertebrates

### Research Associates

WILLIAM DALL, Ph.D., Physiological ecology of crustacea
JAN KOHLMEYER, Ph.D., Marine mycology
A. N. SASTRY, Ph.D., Effects of environmental factors on development and survival larvae
WINONA VERNBERG, Ph.D., Influence of temperature on tissue respiration

### Graduate Students and Research Assistants

MRS. M. F. BALDWIN, A.B.
MRS. MARILYN BARNES, A.B.
C. K. BARTELL, M.A.
RICHARD BLANQUET, B.S.
WILLIAM CARR, B.S.
M. CERAME-VIVAS, M.A.
FRED GRASSLE, B.S.
RICHARD HEARD, B.S.
MRS. CAROLYN HOSS, A.B.
MRS. ERIKA KOHLMEYER
NANCY KRATOWICH, B.A.
SHIRLEY MIDGETT
MRS. ALENE MCCUTCHEON, I
JANET LEONARD
JOANNE O'CONNELL, B.S.
J. H. PAYNE, B.Sc.Hons.
DAVID SCHNEIDER, A.B.
SANDRA WOODS, Ph.D.

### Technical Staff

JOHN NEWTON, Assistant to the Oceanographic Program Director
DAVID BEVERIDGE, Ship's Captain
NORRIS HILL, Technical Superintendent
MRS. MARY FOND JONES, Secretary and Librarian
MRS. E. CAROLYN WARD, Secretary-Bookkeeper, Oceanographic Program
MRS. ESTELLE G. MERRELL, Secretary
CRAIG HORNE, Stockroom & Mail Clerk
JAMES WILLIS, Assistant Caretaker
CLIFTON DAVIS, Assistant Caretaker

# INSTRUCTIONAL PROGRAM

All courses offered at the Laboratory are intended for graduate students and ors. Admission is subject to the approval of the instructor.

### FIRST TERM (June 9-July 15)

**oology 203. Marine Ecology.**—A study of marine animals in relation to environment. ideration of environmental factors, succession, rhythms, communities, intraspecific and specific relations, productivity, conservation, problems, etc., concerned with animal life e ocean. Lectures, reviews, conferences, field and laboratory work. 6 semester hours.
MR. GRAY

**oology 250. Physiological Ecology of Marine Invertebrates.**—A study of the physiological onses of marine animals in relation to certain environmental factors and evolution. Ani- representing numerous phyla and from various habitats are studied. Prerequisite: se in Physiology. 6 semester hours.
MR. VERNBERG

**oology 353. Research.**—Hours to be arranged. Approval of instructor required. STAFF

**otany 225. Special Problems.**—Hours to be arranged. Approval of instructor required.
MR. JOHNSON

**otany 359. Research.**—Hours to be arranged. Approval of instructor required.
MR. JOHNSON

### SECOND TERM (July 17-August 21)

**otany 211. Marine Algae.**—Classification, taxonomy, morphology, distribution, ecology, economic uses of marine algae; preparation of herbarium material. In addition to ction, field work will provide students an opportunity to observe associations of marine e *in situ* by means of diving equipment, if they wish to use it. 6 semester hours. MR. HUMM

**oology 214. Biological Oceanography.**—Composition in time and space of marine bio- re in relation to descriptive marine chemistry, physics, and geology. Some work at sea rd the research vessel. *Prerequisites:* A course in Invertebrate Zoology, Ecology, Marine gy or an appropriate equivalent. Chemistry through organic. One year of Physics and ematics. 6 semester hours.
MR. MENZIES

**oology 274. Marine Invertebrate Zoology.**—A study of invertebrate animals that occur e Beaufort region. A number of field trips will be made to a variety of habitats to and to collect animals in their natural environment. The structure and habits of living tebrates, as well as their behavior under experimental conditions, will be studied in aboratory. 6 semester hours.
MR. BOOKHOUT

**otany 226. Special Problems.**—Hours to be arranged. Approval of instructor required.
HUMM & JOHNSON

**otany 360. Research.**—Hours to be arranged. Approval of instructor required.
HUMM & JOHNSON

**oology 354. Research.**—Hours to be arranged. Approval of instructor required. STAFF

### SEMINARS

**oology 355 O. Deep-Sea Biology.**—Reading, discussion and problem participation aboard rch vessel. Schedule to be arranged. 2 semester hours. Fall—1964.
MR. MENZIES

**oology 355 O and 356 O. Advanced Oceanography.**—Lectures by staff and visiting nographers of national reputation. Schedule to be arranged. Fall—1964 and Spring—1965.
MR. MENZIES

## APPLICATIONS AND ADMISSION

Application should be received by March 15. Notification concerning admission will ailed about April 1. An application form is provided on the back page of this tin. The completed application should be sent to the Director of the Summer ion, Duke University, Durham, North Carolina.

High school teachers or college seniors should send a transcript of grades with the ication blank. Undergraduates desiring transfer of credit to their home institution ld request course approval form for transfer of credit. Graduate students wishing pply summer credits toward an advanced degree at Duke University must, in

addition to filling in an application blank, register with the Duke University Gradu School. A place in a particular course cannot be assured until the tuition and laborat fees are paid.

Students who have had adequate preparation may request space for independ or thesis research.

The last day of registration and suggested time of arrival for the first term June 9. Students living on campus at the Laboratory should report to the Laborat Business Office before 4:00 P.M. for room assignments. Classes commence at 8:00 A. Wednesday, June 10.

Second term personnel should report not later than 4:00 P.M., July 16.



Class in Marine Biology

## AWARDS

### Predoctoral Awards:

For the summer of 1964 National Science Foundation predoctoral awards will offered for research or for course work including special problem research at the D University Marine Laboratory. The basic award is $300 for a period of five we A limited travel allowance will be given. A tuition fee of $210.00 is charged to pers holding awards.

A graduate student or teacher working toward an advanced degree at any univers may apply. Selections will be based upon undergraduate and graduate transcri and three letters of recommendation. Applications should be received by March Address inquiries to the Director, Duke Marine Laboratory, Beaufort, North Caroli

### Postdoctoral Awards:

National Science Foundation postdoctoral awards of $1,800 are available twelve weeks' research in Marine Biology at the Duke University Marine Laborat A limited travel allowance will be given. A member of any academic or research in tution, other than Duke University, may make application. The work may be car



YSICAL PLANT OF DUKE UNIVERSITY MARINE LABORATORY WITH BEAUFORT IN BACKGROUND

at any time during the year. Completed applications should be received by March 15. dress inquiries to the Director, Duke Marine Laboratory, Beaufort, North Carolina.

**aineeships in Biological Oceanography:**

Six graduate traineeships with a stipend of $3,000 per academic year will be ilable to qualified advanced predoctoral students of oceanography from any U. S. iversity for thesis research at the Duke University Marine Laboratory.

Application for an award must be completed no later than February 15, 1964. tification is made about April 1, 1964.

Awards will commence on September 1 and are intended to terminate after nine nths.

Inquiries should be addressed to Dr. R. J. Menzies, Oceanographic Program Di- tor, Duke University Marine Laboratory, Beaufort, North Carolina.

# FACILITIES

## The Laboratory:

Through the efforts of A. S. Pearse, the Duke University Marine Laboratory w established in 1938 on Pivers Island near the town of Beaufort, North Carolina. T first research laboratory was built in 1949. Other laboratories were added in 195 1957, and 1960. With the acquisition of a new modern dormitory on the southern po tion of the island in early 1963, and renovation of the laboratories, the Marine Laborato can offer increased opportunities to conduct year round research. Studies are current being conducted in the fields of ecology, systematics, physiology, parasitology, embr ology, physiological mycology, algology, algae, and biological oceanography. The compl tion of the Oceanographic Laboratory in February, 1964, will provide facilities for expanded program in oceanography.

The Duke University Marine Laboratory presently occupies thirteen acres of Pive Island. The U. S. Fish and Wildlife Laboratory is also located on this Island. T present plant consists of sixteen buildings including three dormitories capable of hou ing forty-eight people, a large dining hall, two residences, boathouse, classroom labor tories and four research laboratories. In February, one additional 3,200 square fo research laboratory will be ready for occupancy which, in addition to classroom faciliti will have research areas for studies in the field of oceanography.

The station owns a 39-foot cabin boat equipped to trawl and dredge in the su rounding sounds and channels. A 27-foot outboard power boat, row boats and skif outboard motors and collecting gear, and a well-equipped workshop are also availab

The Laboratory maintains a stockroom of chemicals, glassware, supplies, a equipment for the use of students and investigators.

## Oceanographic Research:

A 118 foot research vessel with a capacity for ninety-nine students on eight-ho cruises, and fifteen students and staff on extended cruises, will be available by Augu 1964. This ship will operate on the Eastern Seaboard from Virginia to Florida a



Collecting on the Breakwaters

nd the Continental Shelf. It will be outfitted with the most modern recording and cting devices and will be available for use by teachers of oceanography and their nts. Application for ship time must be made in advance. Address inquiries to R. J. Menzies, Director, Oceanographic Program, Duke University Marine Laboratory Beaufort, North Carolina.

### ipment and Supplies:

Visiting investigators may obtain research space throughout the year. Each research laboratory building is equipped with running sea water through an open hard ter system. There are tanks, water tables, aquaria, autoclave, ovens, and plant ses. In addition to commonly used laboratory equipment, the following are available: gerated centrifuge with multispeed attachments, Beckman DU spectrophotometer, ices, pH meters, hoods, and constant temperature equipment. Each person is cted to supply his own optical equipment or other special equipment needed. A list quipment, chemicals and glassware is available upon request. A darkroom and a l reference collection of marine algae and vascular flora are also maintained.

### ecting:

Spades, shovels, sieves, nets, and rowboats are provided without charge to assist investigator in his collecting. The 39-foot boat is available for dredging and ling at $10.00 per hour.

### ary:

The library at the Laboratory contains approximately 3,000 reference books and nals, 96 current journals, and 8,500 reprints. In addition other materials may be ined on loan from the libraries on the main campus through regular delivery service.

## GEOGRAPHIC INFORMATION

Beaufort is approximately midway between Woods Hole, Massachusetts, and Miami, ida. It is, therefore, in the southern range of many plants and animals which occur he New England coast and in the northern range of species which are found off the ida coast and in the West Indies. The edge of the Gulf Stream system is about 35 s offshore, and between it and the shore are occasional reefs.

The Beaufort area is strategically located for biological research because of the ness of its flora and fauna, and the ease with which one may reach a variety of tats. From the Laboratory by boat or automobile it is easy to reach the ocean, ue and Core Sounds, Harker's Island, rivers, creeks, canals, mud flats, sand beaches, s, marshes, peat bogs, cypress swamps, bird islands and rookeries, and coastal sts. Long leaf pine, yaupon, and at least seven species of insectivorous plants otected by law), including the Venus flytrap, grow in the region. A great variety of e, both freshwater and marine, is available. Common animals include the king crab, d, shrimps, snails, clams, ctenophores, jellyfish, hydroids, sponges, polychaetes, e species of sea urchins, starfish, brittle stars, sand dollars, many fishes, skimmers, s, gulls, herons, sea turtles, and porpoises.

A check list of flora and fauna is available from the Director upon request. There 25¢ service fee.

## GENERAL INFORMATION

### nate:

The Beaufort area is well known for its moderate climate during the summer. Air peratures range from an average minimum of 70°F. to an average maximum of 86°F. re is a prevailing southwest breeze from the ocean during most of the summer. Water peratures range from 22-29°C. in June and from 24-30°C. during August.

### thing:

Students should bring clothes suitable for field work including a sun hat, tennis s, bathing suit, shorts, work gloves and sun glasses.

### reation:

There are ample opportunities for recreation in and around Beaufort—swimming, ng, boating, water-skiing, etc. On campus recreational facilities include swimming, ng, shuffle-board, horseshoe pitching, volleyball, croquet and table tennis.

### Travel:

Pivers Island is across a channel from the town of Beaufort. The Island is re accessible by automobile. Piedmont Airlines provides air service to New Ber distance of 40 miles from Beaufort.

## LIVING ACCOMMODATIONS

### Dormitories—Summer Session:

The three dormitories will accommodate a total of forty-eight people. Rent person for one term with two occupants per room is $35.00. Individuals must su their own linens, blankets and towels. Pillows will be furnished.

Dormitory rooms are not available without board.

### Beaufort Housing:

Rooms in the Beaufort area may be obtained for approximately $10.00 per per person. Bed linens, pillows and towels are supplied.

Furnished apartments may be rented from $45.00 per month and up.



New Dormitory

## FEES AND EXPENSES

### Tuition Fees:

The University fee is $35.00 per semester hour for all except teachers in element and secondary schools, who will be charged $15.00 per semester hour. In addition t is a laboratory fee of $10.00.

University and laboratory fees are payable to the Director of the Summer Sess Duke University, Durham, North Carolina, upon registration.

## search Space:

Research laboratories or space in large laboratories are available as indicated in following table:

| No. Spaces | Approx. Sq. Feet | Charge Per Month |
|---|---|---|
| 7 | 80 | $ 80.00 |
| 9 | 112 | 112.00 |
| 5 | 128 | 120.00 |
| 5 | 192 | 180.00 |
| 1 | 200 | 200.00 |
| 1 | 300 | 300.00 |

No additional charges are made for assistants occupying the same research laboories. Graduate students from institutions other than Duke University will be charged e-half the regular rate per person.

When applying for space, investigators should indicate the size of research labtory required.

Requests for research space should be made to Dr. F. J. Vernberg, Assistant ector, Duke University Marine Laboratory, Beaufort, North Carolina.



Research Lab in Physiological Ecology

## ning Hall:

The charge for full board in the Duke University Marine Laboratory Dining Hall $17.50 per week or $87.50 in advance, for one term. This fee provides three meals r day, Monday through Saturday, and breakfast and noon dinner on Sunday. Students iding on campus are required to board at the Dining Hall.

Research personnel and their families residing off campus are cordially invited to end the Dining Hall. Arrangements can be made with these personnel for occasional als if sufficient notice is given to the Laboratory Business Office or Dining Hall pervisor.

The following rates will be in effect from June 10 through August 21:

| | |
|---|---|
| Breakfast | $ .65 |
| Lunch | .90 |
| Dinner | 1.25 |
| Sunday Dinner | 1.50 |

Children under twelve will be charged one-half the adult rate.

## LECTURES AND RESEARCH SEMINARS

### Evening Lectures:

During the summer of 1963 the following evening lectures were presented:

| Date | |
|---|---|
| 13 June | Reefs and shoals of the Tortugas, Dr. K. H. Brooks, Geology Department, U versity of Florida, Gainesville, Florida. |
| 20 June | The Role of Organic Detritus in Organic Communities, Dr. Rezneat Darnell, Zool Department, Marquette University, Milwaukee, Wisconsin. |
| 27 June | Aspects of the Internal Anatomy of Deep-Sea Mollusca, Dr. William Layton, Lederle Laboratories, Pearl River, New York. |
| 3 July | Limnology of the Upper Ohio River, Dr. William Woods, University of No Carolina Institute of Fisheries Research, Morehead City, North Carolina. |
| 11 July | Amphibious and Terrestrial Crabs: Experiments with Life on Land, Dr. Rob Barnes, Biology Department, Gettysburg College, Gettysburg, Pennsylvania, A. Pearse Memorial Lecturer, 1963. |
| 18 July | Coastal Oceanography and Marine Fisheries Research at the Marine Biologi Station, Vera Cruz, Mexico, Mr. John Reintjes, U. S. Bureau of Commercial Fi eries, Beaufort, North Carolina. |
| 25 July | Investigations on Marine Fungi in Southern France, Dr. Jan Kohlmeyer, Botani Museum, Berlin-Dahlem (Germany). |
| 1 Aug. | Comparative Aspects of Carbohydrate Metabolism in Decapods, Dr. John De Duke University Marine Laboratory, Beaufort, North Carolina. |
| 8 Aug. | Biological Work Aboard the USNS *Eltanin* in the Antarctic, Dr. George Lla Assistant Director, USARP, N.S.F., Washington, D.C. |
| 15 Aug. | The Hatteras Barrier, Maximo Cerame-Vivas, Duke University Marine Laborato Beaufort, North Carolina. |

### Research Seminar—Summer 1963:

Investigators and students met Monday evenings to discuss current research be conducted at the Laboratory. The following research seminars were presented:

Embryological Studies on *Fundulus*, Dr. Anna Ruth Brummett, Oberlin College, Ober Ohio.

The Biology of Rotifers, Dr. Royal Bruce Brunson, Montana State University, Misso Montana.

Carbon Dioxide Fixation in Invertebrates, Dr. Carl Hammen, Adelphi College, Gar City, L. I., New York.

The Influence of Salinity on Respiration, Dr. Elizabeth King, Vassar College, Pou keepsie, New York.

Trematode Larvae in Marine Invertebrates, Dr. Donal Myer, Southern Illinois U versity, Alton, Illinois.

Commensalism in Sand Dollars, Lawrence McCloskey, Duke University, Durham, No Carolina.

Courtship Patterns of *Uca*, Michael Salmon, University of Maryland, College Pa Maryland.

Thermolethal Limits of Invertebrates, David Schneider, Duke University Marine Labo tory, Beaufort, North Carolina.

Temperature Induced Herniation in Mollusks, Dr. Earl Segal, Rice University, Houst Texas.

## RECENT PUBLICATIONS

Listed below are recent publications of personnel working wholly or in part at the ke University Marine Laboratory.


Z, K. M. S., & H. J. HUMM. 1962. Additions to the algal flora of Beaufort, North Carolina, and vicinity. J. Elisha Mitch. Sci. Soc. 78: 55-63.

KHOUT, C. G., & F. J. VERNBERG. 1963. Duke University Marine Laboratory. Am. Zool. 3: 270-272.

UT, SHIRA Y., & T. W. JOHNSON, JR. 1962. Some biological observations on fungi in estuarine sediments. Mycologia 54: 181-193.

AME-VIVAS, M. J. 1962. A method for holding small aquatic invertebrates. Turtox News 40: 60-61.

AME-VIVAS, M. J., AUSTIN B. WILLIAMS & I. E. GRAY. 1963. New decapod crustacean records for the coast of North Carolina. Crustaceana 5: 157-159.

TLOW, J. D., JR. 1963. The effect of eyestalk extirpation on metamorphosis of megalops of the blue crab, *Callinectes sapidus* Rathbun. Gen. & Comp. Endocrinol. 3: 120-130.

TLOW, J. D., JR. 1963. Regeneration and metamorphosis in larvae of the blue crab, *Callinectes sapidus* Rathbun. J. Exp. Zool. 152: 219-228.

TLOW, J. D., JR. 1963. Molting and cyclic activity in chromatophorotropins of the central nervous system of the barnacle, *Balanus eburneus*. Biol. Bull. 124: 254-261.

TLOW, J. D., JR., & C. G. BOOKHOUT. 1962. The larval development of *Sesarma reticulatum* Say reared in the laboratory. Crustaceana 4: 281-294.

TLOW, J. D., JR., & C. G. BOOKHOUT. 1962. The larval stages of *Hepatus epheliticus* reared in the laboratory. J. Elisha Mitch. Sci. Soc. 78: 111-125.

TLOW, J. D., JR., C. G. BOOKHOUT & R. MONROE. 1962. Salinity-temperature effects on the larval development of the crab, *Panopeus herbstii* Milne-Edwards, reared in the laboratory. Physiol. Zool. 25: 79-93.

SP, D. J., & J. D. COSTLOW, JR. 1963. The tolerance of developing cirripede embryos to salinity and temperature. Oikos 14: 22-34.

Y, I. E., & M. J. CERAME-VIVAS. 1963. The circulation of surface waters in Raleigh Bay, North Carolina. Limn. & Oceano. 8: 330-337.

NSON, T. W., JR. 1963a. Some aspects of morphology in marine Ascomycetes, *Corollospora* Werdermann. Nova Hedwigia 6: 83-93.

NSON, T. W., JR. 1963b. Some aspects of morphology in marine Ascomycetes, *Halosphaeria* Linder. Nova Hedwigia 6: 67-81.

NSON, T. W., JR. 1963c. Some aspects of morphology in marine Ascomycetes, *Amylocarpus* Currey, *Herpotrichiella* Petrak and *Torpedospora* Meyers. Nova Hedwigia 6: 157-168.

NSON, T. W., JR. 1963d. Some aspects of morphology in marine Ascomycetes, *Cerio-sporopsis* Linder. Nova Hedwigia 6: 169-178.

NSON, T. W., JR., & WILLIAM R. ANDERSON. 1962. A fungus in *Anomia simplex* shell. J. Elisha Mitch. Sci. Soc. 78: 43-47.

NSON, T. W., JR., & A. R. CAVALIERE. 1963. Some aspects of morphology in marine Ascomycetes, *Remispora* Linder. Nova Hedwigia 6: 179-198.

UTCHEON, F. H. 1962. Swimbladder volume control in the pinfish *Lagodon rhomboides* (Linn.). J. Cell. & Comp. Physiol. 59: 203-214.

NGUM, CHARLOTTE P. 1962. Source of dichromatism in two maldanid polychaetes. Nature 195: 198-199.

NGUM, CHARLOTTE P. 1962. Studies on speciation in maldanid polychaetes of the North American Atlantic Coast. Postilla Yale Peabody Mus. of Nat. Hist. 65: 1-12.

NZIES, R. J. 1963. General results of biological investigation on the deep-sea fauna made on the USNS (ELTANIN) USARP during Cruise 1 between Panama and Valparaiso, Chile, in 1962. Int. Revue Ges. Hydro. 48: 185-200.

SE, ERNST S. 1962. Shell selection behaviour of hermit crabs. Animal Behaviour 10: 347-360.

MON, MICHAEL, & JOHN F. STOUT. 1962. Sexual discrimination and sound production in *Uca pugilator* (Bosc.). Zoologica Sci. Contr. N. Y. Zool. Soc. 47: 15-21.

Sharp, David T., & I. E. Gray 1962. Studies on factors affecting the local distributi
two sea urchins, *Arbacia punctulata* and *Lytechinus variegatus*. Ecology 42: 309

Vernberg, F. J. 1962. Comparative physiology: latitudinal effects on physiological prop
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Vernberg, F. J. 1963. Temperature effects on invertebrate animals. In Temperature
measurement and control in science and industry. 3 Part 3: 135-141.

Vernberg, F. J. (Editor) 1963. Field stations of the United States. Am. Zool. 3: 245

Vernberg, F. J., & C. Schlieper & D. E. Schneider. 1963. The influence of temperature
salinity on ciliary activity of excised gill tissue of molluscs from North Carolina. C
Biochem. & Physiol. 8: 271-285.

Wells, H. W., & Mary J. Wells. 1962. The distinction between *Acteocina candei*
*Retusa canaliculata*. Nautilus 75: 87-93.

Wells, H. W., & Mary J. Wells. 1962. The polychaete *Ceratonereis tridentata* as a pe
the scallop *Aequipecten gibbus*. Biol. Bull. 122: 149-159.

## Application for Enrollment in the Duke University Summer Session

ector, The Summer Session Date.....
ke University
ham, North Carolina

r Sir:

ase reserve a place for me in the following courses.

| Dept. | No. of Course | Title of Course |
|---|---|---|
| | | |
| | | |
| | | |

gned).....

, Mrs., Miss.....

eet Address..... Rural Route, or P. O. Box.....

t Office..... State.....

tionality.....

In what school or college are you seeking to enroll: (check) Undergraduate credits: nity College (Men).....; Woman's College.....; General Student (unclassi-).....; Graduate credits: Arts and Sciences.....; General (unclassified).....

Do you wish a room reserved for June 9-July 15.....; July 16-Aug. 21.....; rom..... to.....?

Are you at present a college student?.....

so, where?..... What class?.....

you a full-time teacher?..... Where?.....

leges attended & degrees.....

.....

Total number of years
ching position..... teaching experience?.....

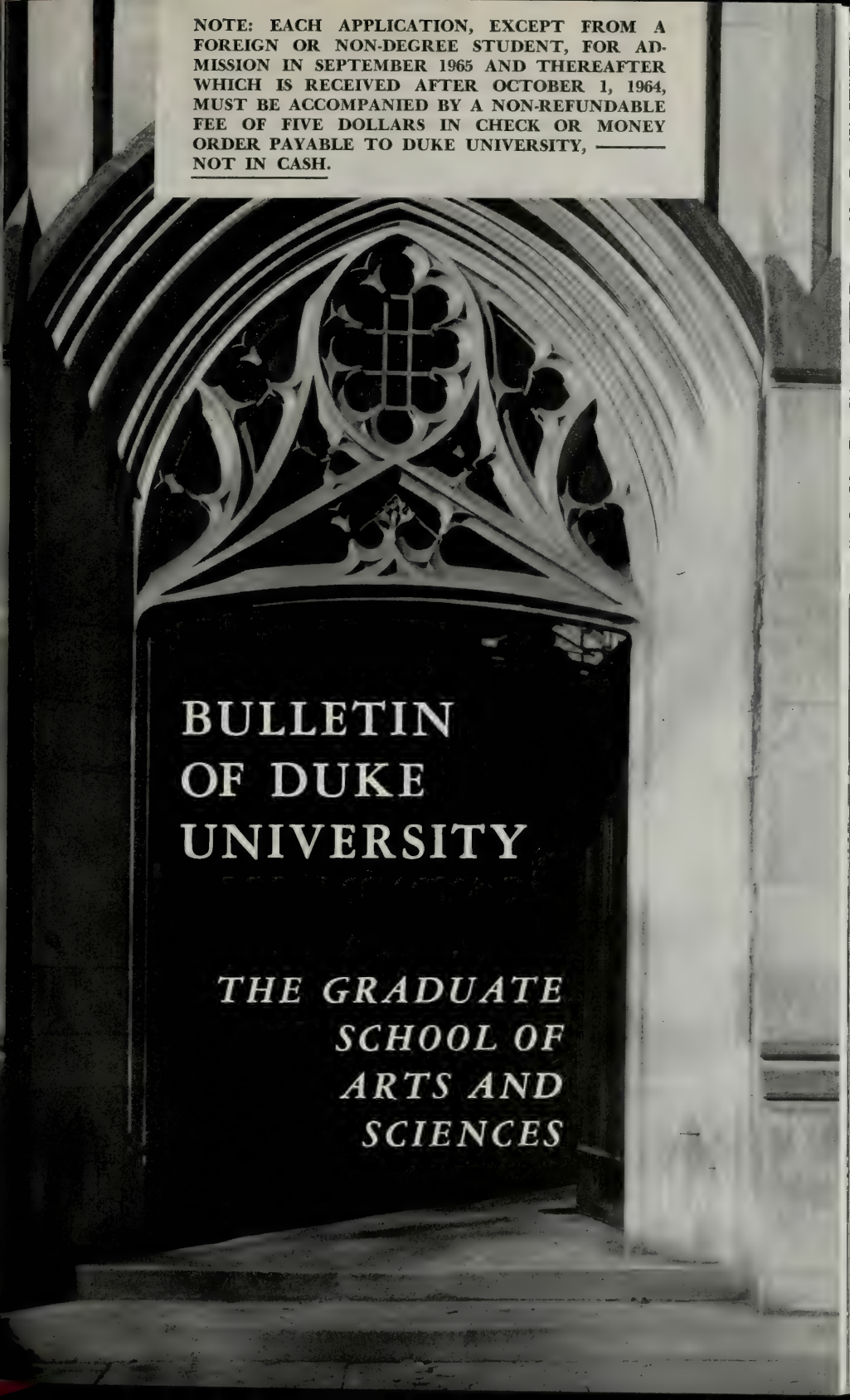
ll your fees be paid by

a) Yourself?..... b) Veterans Admins.?.....

ve you attended previous Summer Sessions at Duke: Yes.....; Years.....; No.....

proved:.....

NOTE: EACH APPLICATION, EXCEPT FROM A FOREIGN OR NON-DEGREE STUDENT, FOR ADMISSION IN SEPTEMBER 1965 AND THEREAFTER WHICH IS RECEIVED AFTER OCTOBER 1, 1964, MUST BE ACCOMPANIED BY A NON-REFUNDABLE FEE OF FIVE DOLLARS IN CHECK OR MONEY ORDER PAYABLE TO DUKE UNIVERSITY, ——— NOT IN CASH.



# BULLETIN OF DUKE UNIVERSITY

## *THE GRADUATE SCHOOL OF ARTS AND SCIENCES*

# Graduate Education at Duke University

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**To the Prospective Graduate Student at Duke University**

In 1924 a new epoch in Southern higher education began: Trinity College in Durham, North Carolina, became Duke University as a result of the munificent bequest of Mr. James B. Duke. His action has been matched in educational history only by the similar bequests to the Johns Hopkins, Chicago, and Stanford Universities in the previous fifty years. In each of these cases, a university great by both national and international standards came into being.

In keeping with Mr. Duke's desire to emphasize the advanced training of men and women for scholarship and the learned professions, the graduate and professional schools were founded. In its first year, the Graduate School of Arts and Sciences enrolled eighty-six students and granted one Master of Arts degree. In the intervening thirty-six years, the Graduate School has awarded over 3,400 Master's and 1,100 Doctor's degrees. Today there is hardly a major university in the United States which does not have one or more Duke Ph.D.'s on its faculty, and many Duke alumni occupy college and university presidencies and other educational positions of leadership.

To the student in search of a superior graduate education Duke University has much to offer: an outstanding faculty, one of the finest research libraries in the nation, a campus unusual in its spaciousness and beauty. To this student the following pages are addressed; they are meant to provide him with information to help him make one of the crucial choices of his life, that of his future career.

R. L. PREDMORE
*Dean of the Graduate School*

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*Term ends September, 1964

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# Introduction

Writing in the nineteen-twenties, the philosopher and man of science Alfred North Whitehead described the goal of higher education in these terms: "The task of a University is the creation of the future." It is less than ninety years since the founding of the first formally organized graduate school in the United States, but it has become most evident that graduate schools, through their training of teachers, researchers, industrial specialists, scientists, and government advisors, play one of the most vital roles in "the creation of the future."

Ideally, a graduate school is a community of scholars—apprentice, initiate, and master—engaged in imparting and extending the realm of man's knowledge in the arts and sciences. A select group of students is admitted each year to undergo the rigorous discipline of an advanced degree program, the successful among them to emerge as scholars of promise. To enter upon graduate education today is to accept a real challenge; but the decision should not be made lightly or casually. The work towards a doctorate involves several years of tireless effort and possible sacrifice, and the material rewards may be less certain or less bountiful than in some alternative occupation. Pursued with determination, however, graduate education may be the doorway to a stimulating, creative, and meaningful life —a life which few persons who have chosen it would exchange if they had the opportunity of reliving their student years.

The student who is contemplating this challenge usually has many questions in mind; the following pages are an attempt to answer some of them. Many of the comments are applicable to programs at any university for a variety of degrees, although emphasis is placed here on the A.M. and Ph.D. programs at Duke University.

## "Should I go to graduate school?"

This frequent question can be answered only by the questioner himself. The decision to work towards an advanced degree must be a personal commitment born of a real willingness to devote oneself to many months or possibly years of hard intellectual work just at the age when one may be impatient for financial independence and

freedom from academic discipline. Graduate education requires all the energy, enthusiasm, and self-discipline at one's disposal; to enter upon it half-heartedly is almost a certain recipe for discouragement or failure.

An equally important requisite for success in graduate study is the possession of a keen and disciplined intellect. Of this it can only be said that "the proof of the pudding is in the eating." A good undergraduate record may or may not be adequate evidence of ability. Many a student with an excellent undergraduate record has been unsuccessful in graduate study, because his undergraduate training stressed an ability to marshal facts and to articulate these facts rather than real understanding and an analytical mind. On the other hand, many distinguished scholars had undistinguished undergraduate records. It may be of some comfort to remember that Einstein had difficulty in mastering simple mathematics (although one should be certain that he is another Einstein before using this fact as an easy excuse!). In gaining admission to a graduate school, one's undergraduate record is of course an important element, but usually some margin is left to allow for the student who develops a serious academic interest only at a late stage. The student himself is often better able to judge whether his grade record is a true gauge of his ability or represents an under-par performance.

If a student feels he has both the ability and a strong desire to accept the challenge, he should not let other obstacles weigh unduly in his decision. About two-thirds of current students enrolled in Ph.D. programs in American universities have sufficient financial support from university, industry, or foundation sources to meet the minimum costs, and most universities have loan provisions to help the student without adequate resources. Today about forty percent of graduate students are married, and a majority of students' wives work part or full time during their husband's period of residence. Indeed, many wives pursue an advanced program concurrently. In addition to the regular arts and sciences program, Duke for example has a program in secondary school teacher education, a Nursing School, a Physical Therapy program, and a Christian Education program in the Divinity School, which enroll many student wives. Thus during graduate study one need not take the vows of poverty and bachelorhood which were once the prerequisite of guild apprenticeship.

There is no certain way of knowing in advance whether one will be successful or happy in graduate school; in this regard it differs little from any other career path one may choose to follow. It is quite likely, however, that if one has both the motivation and the

ability and does not try it, there will be regrets in later years. Although this must be an individual choice, superior intellectual ability is a scarce human resource, and its encouragement and utilization are a national concern as well as a personal one.

## "How should one choose a graduate school?"

More than one hundred and eighty universities today offer work leading to the Ph.D. degree. Among these are about sixty institutions which grant only two or three such degrees a year in all fields combined. At the other end of the scale are about forty universities which account for nearly seventy percent of all doctorates granted in this country. Duke University is among these latter, as are most of the major institutions which offer work of quality ranging across a breadth of academic disciplines. But even if one can narrow the field to about forty major institutions, how does one select among these and what factors should affect one's final choice? A few key factors are briefly discussed below.

*Size*—Size is not an infallible guide to the quality of a graduate school. There are a number of poor graduate schools of exceedingly large size, and a number of extremely good small ones. There are advantages, however, in attending a university which has attained a certain level of size, although it is difficult to provide a magic number to use as a yardstick. It is simpler to mention a few of the disadvantages of too many or too few students.

An extremely large graduate school—and there are a few today which have between three and six thousand enrolled—is a rather far cry from the ideal of a small number of superior students working closely in intellectual pursuits with a few esteemed scholars. Classes of fifty to a hundred students, inaccessibility of senior faculty, shortage of library materials and facilities, only a nodding acquaintance with fellow students—these are only a few of the possible drawbacks. A very able student may develop well even in such an atmosphere of mass production, but this situation is hardly the ideal.

An extremely small graduate school also has its disadvantages. Most of the classes are likely to be mixed undergraduate-graduate classes, a student is not surrounded by many other good students who will help to sharpen his powers and create an atmosphere conducive to learning, facilities are often very limited, and the faculty are often primarily undergraduate instructors. A university must be willing to commit a significant portion of its resources to develop a graduate program of high quality, and this is often not the case in an extremely small graduate school.

More important than the size of the entire graduate school is the size of the particular departmental program one is interested in. An optimum doctoral program will have an enrollment of perhaps thirty to one hundred students, admitting fifteen to forty new students each year, and turning out perhaps three to ten Ph.D.'s per year. Information on enrollment or degrees conferred is usually available in university catalogues or government publications on higher education, and a prospective student may find it useful to compare enrollments in various institutions before choosing a school.

Duke University is firmly committed to programs of moderate size where the interest of the student is paramount. Total enrollment in the graduate school is about 1100 students; approximately three hundred and fifty new students are admitted each year from about twenty-five hundred applications. Only three departments (1963) have more than eighty students; twelve departments have enrollments that fall within the optimum range suggested in the preceding paragraph.

*Quality*—Not only do universities differ considerably in their reputation for quality, but there are marked differences among departments within any university. Harvard, for example, is a great university because it has many reputable departments, not because it is best in every category. On the contrary, many excellent universities have a few quite weak departments in which a student would fare less well than he might in an excellent department in a less esteemed institution. One should therefore not be guided solely by the reputation of a university as a whole, but inquire more specifically about the area in which one wishes to specialize.

Since judging the quality of a graduate program is necessarily subjective, no two people are likely to be in complete agreement. The prospective student would do well to talk with his professors in his undergraduate college, particularly those who have themselves achieved some reputation in the world of scholarship. As witnessed by their own continuing writing and research, they are more likely to have reliable information on the merits of various graduate programs. Similarly, the younger faculty member who is only four or five years out of graduate school may have more recent acquaintance with his and other schools. The relative position of a department may change markedly over the years, so that it is of little value to know the relative ranking, for example, of the Yale department of Economics in the 1930's when one is concerned with the merits of its graduate program in the 1960's.

Certain other measures may be of some use in choosing a grad-

uate school of quality, although they may not be perfect reflectors. The number of Woodrow Wilson Fellows enrolled in recent years is of possible interest in this regard. These fellowships permit the superior entering student to attend the graduate school of his choice, and thus provide a rough guide to the preferences of other good students. For the years 1958-1961 Duke ranked fourteenth in the country in the total number of Woodrow Wilson Fellows in attendance (fifth rank if one measures Woodrow Wilson Fellows as a percentage of total graduate enrollment).

Another yardstick to quality, albeit an imperfect one, may be the occasional questionnaires asking other educators to rank various graduate departments. In one of the most recent of such surveys, where department chairmen in many institutions were asked to rate graduate departments in a list of thirty major universities, Duke placed a number of its departments within the first fifteen in the country.

None of these guides is adequate in itself, but taken in conjunction with individual advice and recommendations they may help the student in his selection. An extremely good student can obtain a good graduate education in a number of universities, but in such an important choice it pays to be as well informed as possible.

The best procedure is to take many factors into account in choosing where to apply for admission, and then make application at the two or three schools one would most like to attend. (Applying at fifteen universities is merely a waste of an applicant's time and theirs.) It is wisest not to make a final selection solely on the basis of financial aid available, on the advice of a single friend or advisor, or on a university's past prestige. One should get as much current information as one can, write to the Graduate School or the departmental Director of Graduate Studies if further information is desired, visit the university in person if possible, and carefully weigh the advice of the more distinguished faculty members of one's undergraduate college.

## "How long will it take?"

One of the primary questions in the mind of every student considering graduate study is "How long will it take?" This is not an easy question, however, for the answer depends partly on the requirements of the student's program, partly on the student himself, and partly on the attitude in the graduate school and the department in which he is studying.

Degree requirements are usually stated quite unambiguously. For example, at most institutions, as at Duke, a typical Master of Arts program requires one academic year of residence for the fulfillment of course requirements, the passing of a language examination, and the completion of an acceptable thesis. This normally takes a minimum period of one calendar year. The Doctor of Philosophy program requires two years of course work, plus demonstration of proficiency in two languages and satisfactory completion of a dissertation embodying the results of original research. Three years is the usual minimum time required for the Ph.D.

The student's level of preparation before entering graduate school has a direct bearing on the speed with which he can progress towards a degree. One who enters with proficiency in one or more foreign languages and a good foundation in his chosen subject area may well be able to finish within the minimum time limits suggested above. On the other hand, the poorly prepared student may find that one and a half to two years are the minimum for the A.M., and four to five years for the Ph.D. (although wise use of the summers may reduce this time somewhat). The total time may also be lengthened if the student must work during part of his period of residence for financial reasons. (More on this subject below, under Financing Graduate Education.)

The attitude of the graduate school and its various departments will also affect the time needed to complete the degree. During the last decade the average time elapsing between entering graduate school and receiving the doctorate in American universities has been about seven years. A study of experience at Duke during the early 1950's indicated that the average doctorate in the humanities required a little over seven years, nearly six years in the social sciences, and slightly over four years in the sciences. Over the last few years, however, Duke University has been among the forerunners in striving to reduce the time needed to obtain the Ph.D. without any sacrifice in quality. This effort has taken the form of trying to eliminate the unnecessary delays, particularly those due to financial burdens on the student. Duke ranks among the leading institutions in the country today in terms of financial aid per student from university sources. Moreover, most of this aid is in the form of fellowships and scholarships which do not require burdensome services in return. The large public institutions are often more restricted to awards which require substantial teaching, research, or other duties, thus reducing the speed with which a student can complete his resident course work. A student will be wise to inquire to what extent his progress towards a

degree may be delayed by the work entailed in certain awards. If, for example, an assistantship lengthens unduly the time necessary to obtain a degree, even a smaller fellowship may be preferable.

Another way in which Duke encourages deliberate speed towards fulfilling degree requirements is through its tuition charges. Many graduate schools charge tuition for three full years in a doctoral program. In 1958 Duke adopted the policy of charging full tuition and fees only up to the time the doctoral student passes his "preliminary examination." (This examination is taken upon completion of all course requirements, normally at the end of the second year, before the student is formally admitted to candidacy for the Ph.D.) After "prelims," tuition charges are substantially reduced. In making his choice of a graduate school, a prospective student should inquire about the fees for a full doctoral program, not merely the charges for the first year. The new tuition and fee system at Duke has worked to encourage both the student and his department to arrange for preliminary examinations to be taken before the beginning of the third year. Five years ago fewer than half of the doctoral students at Duke took this examination before the beginning of the third year; today over ninety percent are doing so. This plan, aided by liberal scholarship and fellowship aid, gives the graduate student at Duke a marked advantage over his counterparts in many other graduate schools in acquiring his degree in the minimum amount of time.

How long it will take to obtain an advanced degree, therefore, depends on many factors, but the policy of the Graduate School is to keep the time to the minimum consistent with continuing quality in its graduate programs.

## Financing graduate education

The typical entering graduate student, after completing his four-year undergraduate program, may not be able to continue with support from his family or from part-time earnings. All graduate schools, in order to minimize financial barriers for superior students, have at least modest funds at their disposal in the form of scholarships, fellowships, or assistantships. Some few among the private universities have sufficient funds to aid more than half of their graduate students and often make total awards which are considerably greater than their entire tuition income from such students.

In 1962-63 at Duke sixty-six percent of all students (full-time and part-time) held an award of some type; twenty-nine percent were

aided by Duke funds and thirty-seven percent by funds from other sources.

The student who seeks financial aid from the graduate school of his choice should be certain that he files his request for admission and award at a sufficiently early date. *Applications should be complete not later than February 15th* of the year in which September admission is sought. At Duke, the student's application, including transcripts of his previous college work and letters of recommendation, is then processed by the Graduate School and forwarded to the department in which he wishes to pursue advanced work. The graduate faculty—or admissions committee—in the department reviews all applications and then makes its recommendation to the Dean for announcement on April 1st. (In the case of graduate assistantships, these offers may be made prior to April 1.) The most outstanding applicants are then offered awards, the next in order of ranking are placed on an alternate list, and other students whom we should like to have attend but do not have sufficient funds to aid are given admission to the Graduate School. Because of multiple applications by students, a fraction of the awards offered by any graduate school are turned down by students who finally decide to go elsewhere. Alternates on the award list are immediately notified, and the process continues until the desired number of awards has been made.

The determining factors in the student's position in these rankings are the letters of recommendation, the undergraduate record, and (if required) pre-entrance test scores on the Graduate Record Examination, Miller Analogies Test, etc. Some capable applicants do not show up well according to these criteria, although they sometimes turn out to be excellent students after admission. Often part-time jobs, extra-curricular activities, lack of seriousness of purpose at an early age, or similar factors make a student's undergraduate record a poor gauge of his capabilities. The Graduate School, however, must judge as best it can from limited information, admittedly making occasional errors in judgment. Letters of recommendation usually weigh heavily in these judgments, particularly when the author is a scholar held in high esteem by the faculty of the school to which application is made.

Entering graduate school the first year without an award will not prejudice one's chances for a later award. In the spring of the first year, the graduate faculty reviews the progress of all current award holders, and weighs the applications of others. Awards for

the second and third years are made almost entirely as a result of the student's record in the graduate program. Thus, it is often a wiser course in the long run to enter a good graduate school without an initial award than to go to a much poorer school with modest financial aid. A poor education is never a bargain when viewed in the perspective of a lifetime career!

Awards to entering students at Duke are of three different kinds.

1. *Fellowships* range from $2,000 to $3,400 for the academic year. They are divided into two categories, those from the annual awards budgets of the individual departments, and certain "name fellowships" from special funds or endowments. Foremost among the latter are the $3,400 James B. Duke Fellowships offered to outstanding students. Approximately thirty of these are offered to entering students each year in a competition that crosses departmental lines. Nominations are made by the individual departments from among the regular applicants for admission and award and are judged by a committee of the Graduate Faculty. Regular departmental fellowships usually range from $2,000 to $3,000, and are awarded upon recommendation by each department. Fellowship holders are expected to carry a full course load each semester.

2. *Scholarships* range from $600 to $1,800 for the academic year. Scholarship holders are also expected to carry a full course load each semester. Scholarships are awarded on recommendation by each department.

3. *Graduate Assistantships* range up to $3,100 for the academic year. Assistantships normally require services of the student up to twelve hours a week and permit the students to register for a four-fifths course load. Assistantships are most common in the science departments, where the student often provides laboratory assistance to various members of the faculty. Most graduate assistants remain in residence for at least one of the Summer Sessions during their first two years, carrying sufficient research or course credit so that they can complete their residence requirement of sixty units within two years. In this way, the normal progress towards a degree is not impeded by the reduced load during the fall and spring semesters. Departmental research funds are often available to provide financial assistance during the summer.

In addition to the graduate awards from University funds, other fellowships are available from foundation, government, or industry sources. Among those at the University's disposal are fellowships

in the Commonwealth-Studies Program, for students in Political Science, Economics and History concentrating their studies on the British Commonwealth; Kearns fellowships in Religion; Ford Foundation fellowships in economic development; Lilly Foundation fellowships in Political Science; C. W. Hargitt research fellowships in Zoology; and Cokesbury awards for preparation for college teaching. Duke University also offers fellowships under the National Science Foundation Co-operative Program, and in the first three years of the National Defense Education Act it was awarded fifty-two three-year fellowships in the fields of English, Political Science, History, Economics, Religion, Chemistry, and Anatomy-Physiology-Psychology. A number of other traineeships and assistantships are available in the sciences, Mathematics, and Psychology under grants from the National Science Foundation, National Institutes of Health, and the United States Public Health Service.

Duke has been among the leading universities of its size in attracting Woodrow Wilson Fellows. These fellowships, awarded by a national competition which permits the student to attend the university of his choice, are available only for the first year of graduate study. Duke has also been among the leading universities in the percentage of Woodrow Wilson Fellows who continue their studies with fellowship aid beyond the first year.

Subvention funds, granted to universities attended by Woodrow Wilson Fellows, are used at Duke to provide additional fellowships for advanced students committed to teaching as a career. Fellowships of approximately $1,500, plus tuition, are awarded for work on the Ph.D. dissertation. From the same source a number of supplementary foreign travel grants for dissertation research are awarded each year, awards covering travel expenses up to $1,250. In 1961-62, fellows were in India, Cambodia, Spain, Ireland, England, France, Holland, and the Middle East.

Loan funds are also available for students who do not have sufficient financial resources at their disposal. Loans up to a maximum of $1,000 in any academic year may be obtained either from the National Defense Act Loan fund or from University funds. These carry low interest charges and easy repayment terms. To be eligible a student must have completed one semester's work with good academic standing. Further information may be obtained from the Graduate Office.

It is difficult to estimate a student's financial needs during the years of graduate study because of individual tastes and habits. One can predict with some accuracy, however, the three major items of ex-

pense at Duke: tuition and fees, $1200 for a full program for each of the first two years, normally $240 for the Ph.D. dissertation year; room rent, $250-325 each year in graduate dormitories; and board, approximately $500-550 in the graduate dining halls. Students holding awards are normally paid in eight equal installments beginning in October, and tuition and room fees are deducted monthly on a pro rata basis.

The costs of graduate education are high, but Duke University attempts to allocate its funds so that the superior student is able to finish his work for a degree in the normal length of time regardless of his personal financial resources. This is a contribution to the community of scholarship which the University is glad to bear.

## The Duke University Graduate School

In surveying the progress made in the first seven years after the founding of Duke University, its first President, William Preston Few, wrote that he wanted "to see the Graduate School made strong because it will best and most quickly insure our attaining and maintaining a place of real leadership in the educational world . . . more than anything else here our Graduate School will determine the sort of University we are to build and its standing in the educational world." These opinions have continued to prevail to the present day, with emphasis upon the interdependence of teaching and research as the necessary components of scholarship.

Three hundred and twelve members of the graduate faculty teach the approximately five hundred courses and seminars offered in the Graduate School, and supervise thesis and dissertation research. Many of the major universities of the world have helped to train this faculty; approximately ninety percent of the graduate staff hold degrees from the forty-one institutions which make up the Association of Graduate Schools within the Association of American Universities. By place of birth they represent almost every state in the Union and almost two dozen foreign countries.

The one thousand graduate students currently enrolled represent a similar diversity in background. Approximately forty percent of students recently holding awards are from undergraduate colleges in the South, thirty percent are from the Northeast, twenty percent from the Midwest, eight percent from the Far West, and seven percent from foreign countries. The old maxim that a university is only as good as its faculty might be amended by adding "and no better than its student body." No professor can *give* his wisdom to a student, and no student can *take* his understanding from another. This must

be a reciprocal process between professor and student, and between student and student. The groundwork for learning may be laid in privacy—indeed a certain amount of private study and research is absolutely essential—but the vital stimulus to the learning process comes from one's contact with the minds of other men with similar or related interests. This is precisely why graduate schools are highly selective in their admissions policy, and one of the important reasons why they are willing to offer attractive fellowship awards to outstanding students. The superior student is a valuable catalyst both for his fellow students and for his faculty, and is prized as such.

Faculty and students comprise the essential human factors in education, but their joint endeavor cannot prosper without adequate research and library facilities. Duke University is particularly fortunate in regard to research facilities, for the physics, botany, zoology, engineering and biochemistry laboratories have been entirely built within the last sixteen years, and modernization and expansion have occurred in other scientific areas. It is also the University's pride that it has one of the finest research libraries, the sixteenth largest university library in the nation today. In number of volumes, breadth of coverage, serials, and documents, it is a much more adequate library than that available in many graduate schools with enrollment two or three times as large. To the student in the arts, humanities, and social sciences, for whom the library is the bloodstream of scholarship, this is an immeasurable asset.

Among the many special features of the Graduate School may be mentioned a few of importance to various graduate programs. For students in the biological sciences, the facilities of the Duke Marine Laboratory at Beaufort, North Carolina, are available for course work and research. The Laboratory has research buildings, class rooms, motor vessels, and living quarters which make it one of the best research centers in marine biology in the country. Closer to home are the seven thousand acres of the Duke Forest, managed by the School of Forestry, ideal for research on timber growth, soils and related topics. Students in both the physical and the life sciences frequently avail themselves of the facilities of the Oak Ridge Institute of Nuclear Studies, of which Duke is one of the sponsoring universities.

In the social sciences the Commonwealth-Studies Center is internationally recognized for its graduate training and research program. It is today one of the major centers, from the point of view of both faculty and library resources, carrying on studies of the various areas of the British Commonwealth. The Center is a coopera-

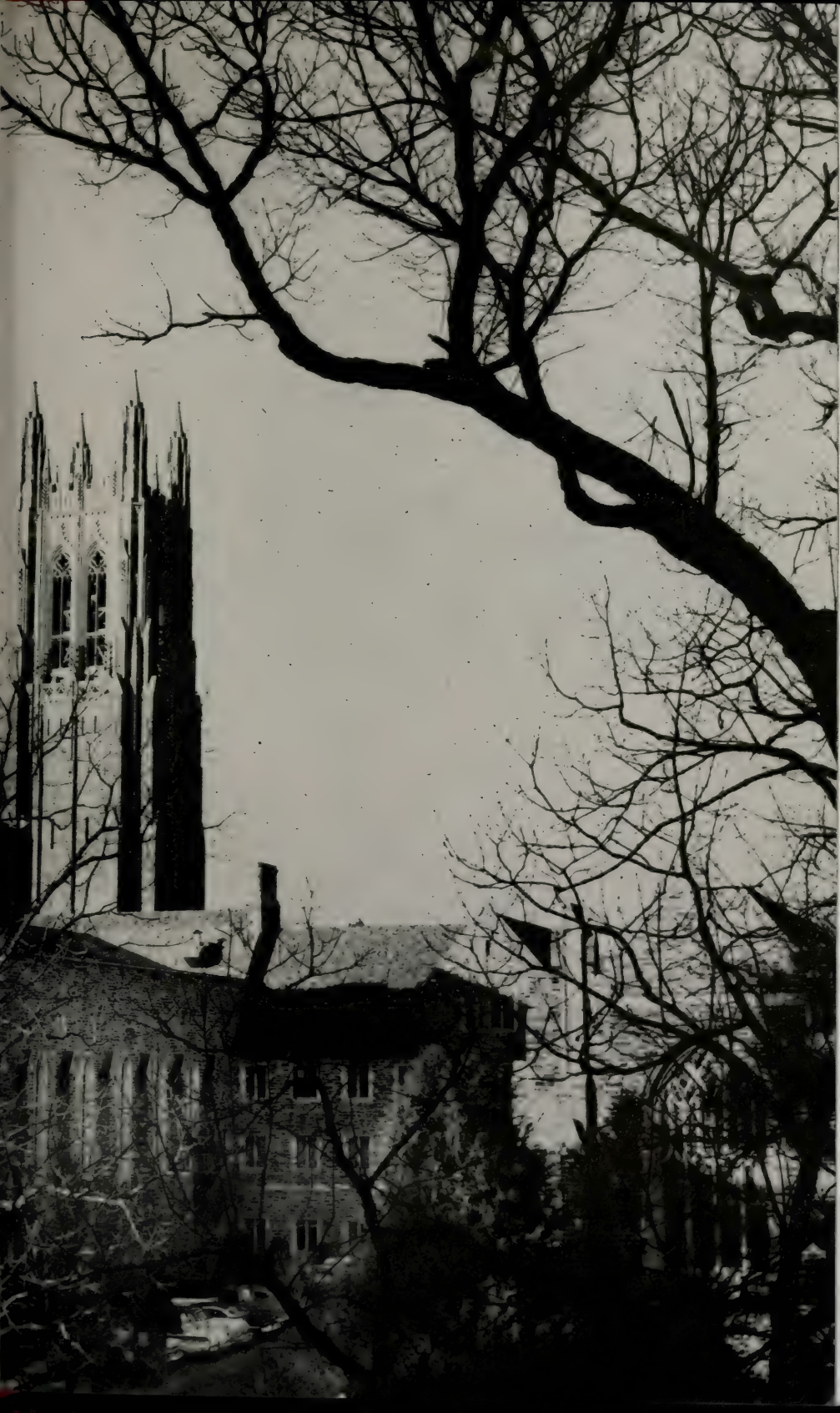
tive enterprise of the Political Science, Economics, and History departments.

Other special teaching or research programs include the Lilly Endowment program in Christianity and the social order, jointly conducted by the departments of Political Science and Religion; the Ford Foundation-sponsored program in gerontology, conducted by the departments of Sociology and Economics; a joint program in the anatomical, physiological and psychological aspects of behavior with support under the National Defense Education Act; a research workshop on economic development for advanced students; and numerous others. Duke is also fortunate in having excellent Medical, Law, Forestry, and Divinity Schools on its main campus, thus making many additional facilities available for course or research work related to the graduate curricula in the arts and sciences. A two-term Summer Session and the availability of courses in the nearby University of North Carolina under a cooperative arrangement offer other opportunities to the graduate student.

* * * * *

No description of programs can begin to give the prospective student the full flavor of graduate study in a particular institution. A visit to the universities one is particularly interested in may be helpful in giving one a better picture. If this should be practical, the Duke Graduate School offers a warm invitation to prospective students to come to the campus during the year to discuss their possible application and admission. The visitor will find at Duke most of the facilities that one could hope for in the largest of institutions, and yet the University has been fortunate in avoiding many of the evils inevitable with mass education. Despite the total University enrollment of approximately 6,500, Duke has retained the sense of community that one usually associates with a smaller liberal arts college. And in an age when current architectural whim often adds yet one more variant style to an already assorted array of buildings, Duke has built with foresight and design a campus of unusual beauty. This, too, is an important part of the fabric of education, creating an environment conducive to learning.

Pictorial representation of some of the facilities for graduate study at Duke University. . . . . .





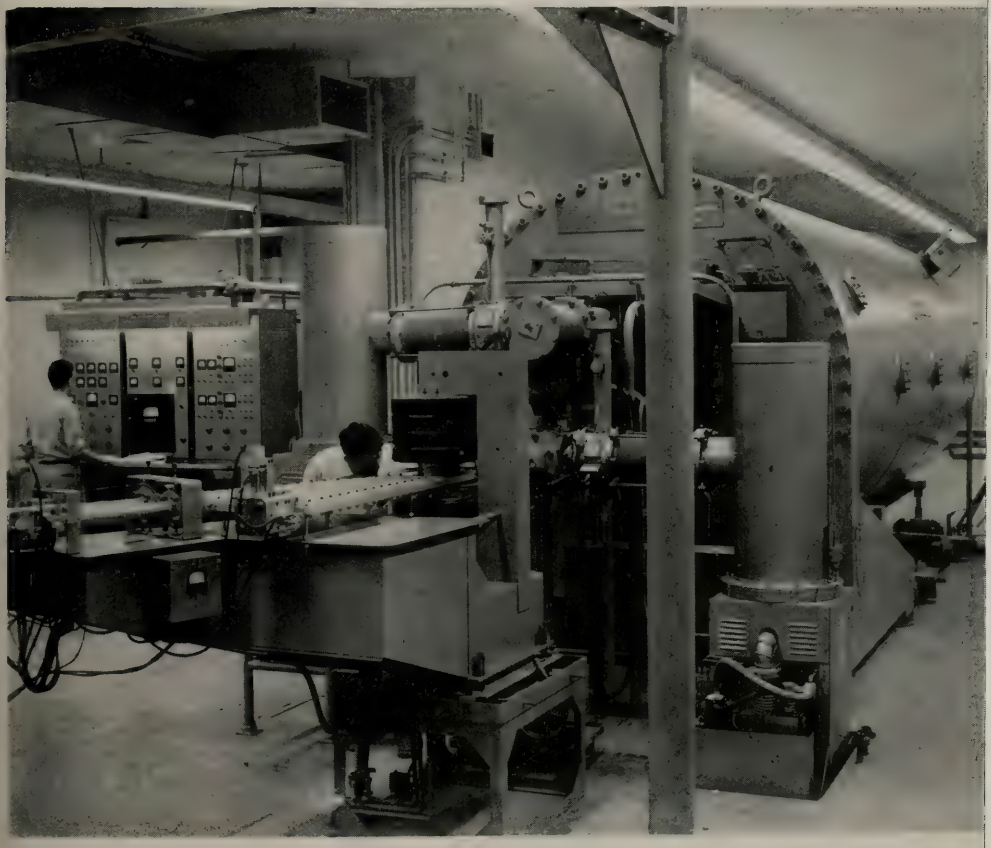
Library stacks, and carrels for assignment to students engaged in graduate study.



The Rare Book Room, which contains a number of notable collections and individual volumes.



A sterile chamber for research in the medical sciences.



A Van de Graaff accelerator for nuclear research.

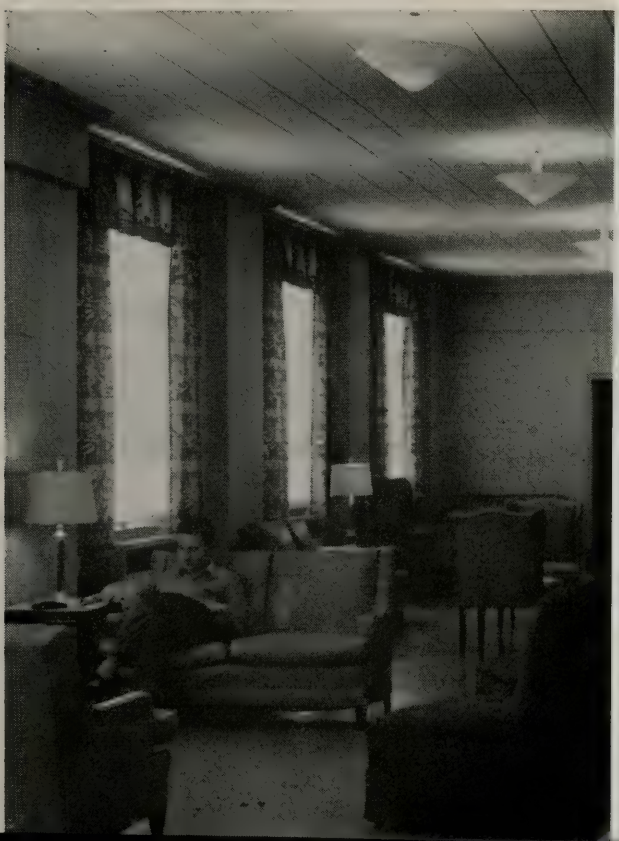


Architect's drawing of the Biological Sciences Building (Botany, Forestry, and Zoology) now completed, fully occupied, but not yet landscaped.

The seminar in college teaching required of all graduate students in History including NDEA Fellows.



Typical living room, partly furnished by the University, in the 224 apartments provided for married graduate students.



A corner of the spacious lounge in the Men's Graduate Center.



Seven-thousand acre Duke Forest, a vast laboratory for graduate study in forestry, botany, and zoology.

Laboratories, classrooms, and residence facilities of the Duke University Marine Laboratory at Beaufort, N. C.



# General Regulations Governing Graduate Studies

The official graduate School *Bulletin,* published in February of each year, gives a detailed account of regulations concerning graduate work at Duke University, and a full description of course content. The following pages are a summary of these materials for 1964-1965, and should provide sufficient information for the prospective student. The *Bulletin* is normally mailed to each student who is admitted to the Graduate School in the late Spring of the year of matriculation so that he may plan his course program for the first year. Copies may be obtained in February, however, by writing to the Graduate School Office, Dept. B., Duke University.

## Admission

Admission is granted at any of the registration periods—September and February for the academic year, June and July for the Summer Session—but the student who plans study mainly in the academic year should enter in September when more courses are scheduled and year courses begin. Closing dates for accepting applications are approximately as follows (see the *Bulletin* for exact dates).

| | |
|---|---|
| *Fall Semester, Admission and Award* | February 15 |
| *Fall Semester, Admission Only* | August 1 |
| *Spring Semester* | January 1 |
| *Summer Session, First Term* | May 12 |
| *Summer Session, Second Term* | June 18 |

Basic prerequisites for admission to a master's program are an A.B. or B.S. granted after four years' study in an accredited institution, approximately a B average in a well-rounded program, and a substantial major in the intended graduate field. The student seeking admission should 1) secure an application form from the Dean of the Graduate School, (one is bound into this bulletin) 2) complete and return it, 3) request that a transcript from any undergraduate or graduate institution attended be mailed promptly by the registrar directly to the Dean of the Graduate School, 4) request that three

letters of recommendation be sent to the Dean by persons able to estimate the applicant's capacity for successful graduate work. As additional evidence of capability, scores on the Graduate Record Examination and the Miller Analogies Test are always welcomed and must be submitted if either has been taken. They may be requested of any applicant whose record is marginal. Departmental requirements are listed below (**required, *strongly recommended):

| | Graduate Record Examination | | Miller Analogies Test |
|---|---|---|---|
| | *Aptitude Test* | *Advanced Test* | |
| All Departments | **[2] | | |
| Anatomy | ** | | |
| Biochemistry | * | * | |
| Botany | * | * | |
| Chemistry | * | * | |
| Civil Engineering | * | * | * |
| Economics | ** | ** | |
| Electrical Engineering | * | * | * |
| English | ** | ** | |
| Forestry | * | | |
| German | * | * | |
| History | *[2] | * | |
| Mechanical Engineering | * | * | * |
| Philosophy | ** | * | **[1] |
| Physics | * | * | |
| Physiology | ** | | |
| Political Science | * | * | |
| Psychology | ** | | ** |
| Religion | * | | * |
| Romance Languages | ** | ** | |
| Sociology | * | * | |
| Zoology | ** | ** | **[1] |

[1] Either GRE or MAT acceptable. [2] For fellowship application.

An applicant who has already earned a master's degree should supply all the information outlined above including recent scores on the Graduate Record Examination and the Miller Analogies Test if these examinations have been taken.

When the application is complete and has been reviewed by the department and the Graduate School Office, a letter of notification will be sent to the applicant (notification will not be sent until April 1 for applications requesting a fellowship award, in keeping with an inter-university agreement). The process of admission is completed when the applicant has filled out and returned the acceptance form.

Admission may be of three types: *full,* without restriction; *provisional,* when some essential document is lacking or the record suggests the advisability of a trial period; *non-degree,* when the student desires transferable graduate credit for certification or for some other purpose but is not undertaking a degree program at Duke. Provisional status is reviewed when the deficiency has been corrected or

after the student has completed 15 units of course work in the academic year or 12 units in the Summer Session. If, on review, the record is found satisfactory, the status is altered to full admission with credit from the time of first registration.

Qualified *foreign students* are welcomed and can be accommodated in most departments. In addition to admission documents required of all applicants, the foreign student must provide 1) a statement by a qualified official that the applicant can read, write, speak, and understand English well enough to pursue a graduate program presented in English (unless he resides in an English-speaking country), 2) a statement certified by a responsible person that his finances are sufficient to maintain him during his stay at Duke University, 3) a statement by a qualified physician describing any emotional or physical illness the applicant has had during the previous five years. In meeting closing dates, foreign students should observe the time for mail to reach Durham.

Details of registration appear in the *Bulletin* and will be sent to all admitted applicants prior to the registration period. A normal full program includes four or five courses or seminars totaling 15 units per semester.

Transfer graduate credit may be accepted in a master's program up to 6 units but will not reduce the total fee-unit requirement here. An applicant for a doctoral program who has earned a master's degree may be granted transfer credit up to 30 units toward the required minimum of 60 units.

## Earning the Degrees

Duke University offers graduate programs leading to the specified advanced degrees in the following fields:

Anatomy, A.M., Ph.D.
Biochemistry, A.M., Ph.D.
Botany, A.M., Ph.D.
Chemistry, A.M., Ph.D.
Civil Engineering, M.S.
Economics, A.M., Ph.D.
Education, M.Ed., M.A.T., A.M., Ed.D. Ph.D.
Electrical Engineering, M.S., Ph.D.
English, A.M., Ph.D.
Forestry*, A.M., Ph.D.
Germanic Languages and Literature, A.M.
History, A.M., Ph.D.
Hospital Administration, M.H.A.
Mathematics, A.M., Ph.D.
Mechanical Engineering, M.S.
Microbiology and Immunology, A.M., Ph.D.
Philosophy, A.M., Ph.D.

*In addition to the regular advanced degrees in the Graduate School of Arts and Sciences, the School of Forestry offers the professional degrees of Master of Forestry and Doctor of Forestry, and the Divinity School the degrees of Bachelor of Divinity, Master of Religious Education, and Master of Theology.

Physics, A.M., Ph.D.
Physiology, A.M., Ph.D.
Political Science, A.M., Ph.D.
Psychology, A.M., Ph.D.
Religion*, A.M., Ph.D.
Romance Languages, A.M., Ph.D.
Sociology and Anthropology, A.M., Ph.D.
Zoology, A.M., Ph.D.

Programs leading to graduate degrees include course and seminar study prescribed by the individual departments; evidence of command of and training in the tools of research including foreign languages; guided and independent reading and laboratory and field experience; a period of residence with constant easy access to the library, laboratory, senior professors, and other graduate students; certain oral and written examinations to exhibit command of the declared field of study; and a thesis or dissertation as a public account of a body of knowledge the student has mastered. A final examination, generally focused upon the thesis or dissertation, enables the student to convince the graduate staff that he has fulfilled his intentions. Time limitations are set for completion of the program so that the initial ambition in undertaking graduate study and the momentum of accomplishment are not lost.

## The Language Requirement

Before admission the student may need to know about the language requirements for which he should prepare. A requirement for the A.M. is command of one acceptable foreign language (French German, Russian, and others if appropriate and approved) evidenced by an objective examination offered during the first registration period or by reading examinations at other scheduled times. (There is no language requirement for the M.Ed., M.A.T., M.H.A., or M.S. degrees.) A requirement for the Ph.D. is command of *two* acceptable foreign languages. (There is no language requirement for the Ed.D. degree). Acceptable command will be shown by examination as described above or, for one language, by transcript evidence of having recently met the requirement in a *doctoral* program elsewhere. Doctoral language requirements must have been met before the student is admitted to the preliminary examination.

Foreign students whose native language is not English, during their first registration period will be examined in their use of English, and those found deficient will be required to enroll in the course entitled English for Foreign Students. Advanced-level noncredit reading courses in French and German are provided for students who need them.

## Other Requirements

General requirements for a master's degree is a *minimum* of 30 units (semester hours) of course-seminar-research credit. If a thesis is presented (required for the A.M. and the M.S., optional for the M.Ed. and the M.A.T.) at least 24 units are allotted to course-seminar work and at least 6 units to thesis research. In the M.A.T. program practice teaching is included for students who lack it, and for them the total units required become a minimum of 36. A pattern of major and minor is prescribed for the course-seminar work, allotting half or more of the units to the major. For example, in the M.S. program (engineering only) up to half the units may be in appropriate fields outside of engineering (such as mathematics or the natural sciences); the M.Ed. allows at least half the units to fall within the student's teaching field, and the M.A.T. allows a major in either Education or teaching fields according to the student's previous training.

A master's program can be completed in one academic year, but the student who presents a thesis normally needs at least a calendar year, and foreign students should be prepared to study for two years. The maximum span of time permitted from first registration to completion of all requirements is six years.

Course-seminar-research requirements in the doctoral program are a *minimum* of 60 units, but the proportions of course-seminar work and research are generally flexible according to the student's needs. The applicant who has already earned the A.M. or M.S. (or for a degree in Religion, the B.D.) after establishing the quality of his work here, may be granted transfer credit to a *maximum* of 30 units (i.e. the equivalent of one year of residence). The dissertation is expected to be a mature and competent piece of writing, embodying the results of original and significant research. All dissertations will be published on microfilm, and the author may retain copyright privileges.

Fairly strict time limitations are set for completion of the doctoral program. The preliminary examination, which may be taken only after language and course-seminar requirements have been met, and which formally admits a student to candidacy for the degree, should normally be passed by the end of the second year and must be passed by the end of the third. The interval between preliminary examination and presentation of an acceptable dissertation should normally be one to two years and may not be more than four years without special approval by the Dean. Should this interval grow beyond five years, a second preliminary examination becomes necessary.

The program for the Ed.D., with no language requirement, is distinctive in that in place of the usual dissertation the candidate, after a year of employment in an administrative or teaching position, may deal with a problem growing out of this experience.

## Financial Regulations

Tuition and fees are charged at the rate of $40.00 per unit (a unit is roughly equivalent to a semester hour), with the normal full program of study being 30 units for an academic year. Upon successful completion of preliminary examinations and at least 60 units of course-seminar-research credits, the normal full program during the dissertation period is 3 units per semester while in residence, or 1 unit per semester while not in residence. Tht basic necessary expenses for a year of graduate study, assuming one lives in University graduate dormitories, are therefore approximately as follows:

| | *1st and 2nd Year* | *Dissertation Year* |
|---|---|---|
| *Tuition and Fees* | $1200 | $ 240 |
| *Room Rent* | 275 | 275 |
| *Board* | 550 | 550 |
| | $2025 | $1065 |

Additional allowance should be made for books, laundry, and other personal expenditures.

Information on fellowships, scholarships, assistantships and loan provisions is summarized in Part 1, above, pages 15-17.

Housing is provided for approximately 400 single men in the Men's Graduate Center, for 57 single women in Epworth Hall, and for 224 married couples in University apartments.

* * * * *

The applicant who wishes further information on facilities and regulations on course programs not covered in this booklet is invited to write to the Director of Admissions of the Graduate School, or the Director of Graduate Studies in the department of intended study.

# Calendar of the Graduate School

## *Summer Session 1963*

First Term—June 9—July 15
Second Term—June 16—August 21

## *Academic Year 1964-65*

First Semester—September 24—January 29
Second Semester—February 4—June 2

| | |
|---|---|
| Sept. 21 | Registration for First Semester |
| Sept. 24 | Classes Begin |
| Nov. 25-Nov. 30 | Thanksgiving Recess |
| Dec. 19-Jan. 4 | Christmas Recess |
| Jan. 29 | End of First Semester |
| Feb. 3 | Registration for Second Semester |
| Feb. 4 | Classes Begin |
| March 27-April 5 | Spring Recess |
| June 2 | End of Second Semester |
| June 7 | Commencement |

# Advanced Degree Programs at Duke

(For full course descriptions including credit and name of instructor see the complete *Bulletin*. Courses offered annually bear no date; those offered only when the demand warrants bear an asterisk.)

## Anatomy

**Professors**

John Wendell Everett, *Ph.D. (Yale);* Duncan Charteris Hetherington, *M.D., Ph.D. (Illinois);* Joseph Eldridge Markee, *Ph.D. (Chicago), James B. Duke Professor of Anatomy, Chairman;* Talmadge Lee Peele, *M.D. (Duke).*

**Associate Professors**

Roland Frederick Becker, *Ph.D. (Northwestern);* Kenneth Lindsay Duke, *Ph.D. (Duke), Director of Graduate Studies;* Montrose J. Moses, *Ph.D. (Columbia).*

**Courses of Instruction**

(*See* Medical School, p 59)
M201. Anatomy as Related to Locomotion
M202. Microscopic Anatomy
M203. Anatomy of the Nervous System
M204. Neuroanatomical Basis of Behavior
M205. Anatomy of the Viscera
M301. Gross Human Anatomy
M312. Research
M313-314. Anatomy Seminar
M404. Interdisciplinary Seminar in the Physiological and Anatomical Bases of Behavior. (also listed as Physiology M404 and Psychology 404)

## Art

**Professors**

Louise Hall, *Ph.D. (Radcliffe);* Ransom Rathbone Patrick, *Ph.D. (Princeton); Visiting Benjamin N. Duke Professor of Art* Justus Bier, *Ph.D. (Zurich).*

**Associate Professors**

Sidney David Markman, *Ph.D. (Columbia);* Elizabeth Read Sunderland, *Ph.D. (Radcliffe).*

No graduate degree is offered in this department, but the following courses are suggested as possible minors for students majoring in history, literature, philosophy, religion, psychology, or sociology, or in any other interested departments.

**Courses of Instruction**

215. Religious Art of the Ancient Near East*
216. Religious Art of the Classical World*
217. Aegean Art
218. Early Greek Art
221-222. History of Aesthetics (1963-64)
233. Early Mediaeval Architecture*
234. Romanesque Sculpture*
236. Gothic Sculpture (Spring 1964)
240. Architecture of North America (1963-64)
239. Architecture of Great Britain
292. Research Problems in the Collections of the North Carolina Museum of Art (Spring 1964)

## Biochemistry and Nutrition

**Professors**

Philip Handler, *Ph.D. (Illinois), Chairman;* Charles Tanford, *Ph.D. (Princeton).*

**Associate Professors**

Mrs. Mary L. C. Bernheim, *Ph.D. (Cambridge);* Eugene A. Davidson, *Ph.D. (Columbia);* Walter R. Guild, *Ph.D. (Yale);* Robert Hill, *Ph.D. (Kansas);* Henry Kamin, *Ph.D. (Duke);* Kenneth McCarty, *Ph.D. (Columbia);* Ralph E. Thiers, *Ph.D. (London);* Salih Wakil, *Ph.D. (Washington).*

**Assistant Professors**

William Lawrence Byrne, *Ph.D. (Wisconsin), Director of Graduate Studies;* Irwin Fridovich, *Ph.D. (Duke);* Ronald C. Greene, *Ph.D. (California Institute of Technology);* Norman Kirshner, *Ph.D. (Pennsylvania State);* William Sanford Lynn, *M.D. (Columbia);* Robert W. Wheat, *Ph.D. (Washington University).*

**Courses of Instruction**

(*See* Medical School, p. 59)
201. Introductory Biochemistry
203. Chemistry of Natural Products
206. Laboratory Methods in Biochemistry
M241. General Biochemistry (for medical students)
301. Energy Metabolism
302. Nitrogen Metabolism (Not 1964-65)
304. Proteins and Enzymes
314. Nucleic Acids
345-346. Seminar
348. Special Topics*
351. Nutrition*
354. Biochemistry of Disease*

## Botany

Graduate work in the Department of Botany is offered leading to the A.M. and Ph.D. degrees. Before undertaking graduate study in botany a student should have had in his undergraduate program at least 12 semester hours of botany beyond an elementary course, and related work in biological sciences. Some work in chemistry and physics will be desirable and, for some phases of botanical study, a necessity. The student's graduate program is planned to provide a broad basic training in the various fields of botany, plus intensive specialization in the field of the research problem.

**Professors**

Lewis Edward Anderson, *Ph.D. (Pennsylvania);* William Dwight Billings, *Ph.D. (Duke), Director of Graduate Studies;* Ellwood Scott Harrar, *Ph.D. (Syracuse);* Paul Jackson Kramer, *Ph.D. (Ohio State), James B. Duke Professor of Botany;* Aubrey Willard Naylor, *Ph.D. (Chicago);* Henry John Oosting, *Ph.D. (Minnesota);* Harold Sanford Perry, *Ph.D. (Cornell).*

**Associate Professors**

Harold J. Humm, *Ph.D. (Duke);* Terry W. Johnson, Jr., *Ph.D. (Michigan), Chairman;* Jane Philpott, *Ph.D. (State University of Iowa);* Robert L. Wilbur, *Ph.D. (Michigan).*

**Assistant Professors**

William L. Culberson, *Ph.D. (Wisconsin);* Donald E. Stone, *Ph.D. (California);* Richard A. White, *Ph.D. (Michigan).*

**Courses of Instruction**

203. Cytology
204. Advanced Plant Anatomy
221. Introductory Mycology
225-226. Special Problems
240. Plant Evolution
252. Plant Metabolism
254. Plant-Water Relations
255. Advanced Taxonomy

256. Community Analysis and Classification
257. Principles of Plant Distribution (Not 1964-65)
258. Physiology of Growth and Development
259. The Environment
260. Lichens
305. Vegetation of North America (Not 1964-65)
310. Bryophytes (Not 1964-65)
311. Algae
359-360. Research in Botany
397-398. General Botanical Seminar

### Forest Botany

253. Dendrology

### Marine Laboratory

Three marine botany courses are given in the Duke University Marine Laboratory, Beaufort, N. C., one each summer in sequence: S205, Marine Microbiology (Not 1964); S207, Marine Mycology (Not 1964); S211, Marine Algae (1964).

## Chemistry

In the Department of Chemistry graduate work is offered leading to the A.M. and Ph.D. degrees. Before undertaking a graduate program in chemistry, a student should have taken an undergraduate major in chemistry along with related work in mathematics and physics.

Graduate courses in the department are designed to provide a broad basic training in the fields of inorganic, organic, analytical, and physical chemistry. An important requirement for the Ph.D. degree is the successful completion, under the direction of a member of the staff, of a research program leading to the solution of an original problem. The choice of the research program, for either the A.M. or the Ph.D. degree, will determine the field of advanced specialization.

**Professors**

Charles Kilgo Bradsher, *Ph.D. (Harvard), Director of Graduate Studies;* Frances Campbell Brown, *Ph.D. (Johns Hopkins);* Paul Magnus Gross, *Ph.D. (Columbia), William Howell Pegram Professor of Chemistry;* Charles Roy Hauser, *Ph.D. (Iowa), James B. Duke Professor of Chemistry;* Douglas Greenwood Hill, *Ph.D. (Princeton);* Marcus Edwin Hobbs, *Ph.D. (Duke);* William R. Krigbaum, *Ph.D. (Illinois);* John Henry Saylor, *Ph.D. (Duke), Chairman;* Pelham Wilder, Jr., *Ph.D. (Harvard).*

**Associate Professors**

Jacques C. Poirier, *Ph.D. (Chicago);* Louis Dubose Quin, *Ph.D. (North Carolina);* Peter Smith, *Ph.D. (Cambridge);* Howard Austin Strobel, *Ph.D. (Brown).*

**Assistant Professors**

Leon Lloyd Jones, *Ph.D. (Utah);* Eric Clifford Toren, *Ph.D. (Illinois);* Richard LeRoy Wells, *Ph.D. (Indiana).*

**Adjunct Professors**

Anton Peterlin, *Ph.D. (University of Berlin);* Vivian T. Stannett, *Ph.D. (Brooklyn Polytechnic Institute).*

**Courses of Instruction**

206. Elements of Theoretical Chemistry
215. Advanced Inorganic Chemistry
216. Nuclear Chemistry
234. Chemical Instrumentation
251. Qualitative Organic Analysis
252. Advanced Organic Preparations
253. Intermediate Organic Chemistry
261-262 Physical Chemistry
271. Introduction to Research
275-276. Research
303. Thermodynamics
304. Physical Chemistry of Reactions
331, 332. Seminar in Analytical and Inorganic Chemistry (Not 1964-65)

342. Advanced Organic Chemistry
350. Organic Reactions
352. Mechanisms of Organic Reactions
353. Special Topics in Organic Chemistry
354. Stereochemistry (Not 1964-65)
360. Polymer Chemistry
361. Advanced Polymer Chemistry (Not 1964-65)
363, 364. Special Topics in Physical Chemistry
365, 366. Chemical Physics, Statistical Theory (365, Not 1964-65; 366, Fall 1964-65)
367, 368. Chemical Physics, Quantum Theory (367, Spring 1964-65; 368, Not 1964-65)
373, 374. Seminar

### Classical Studies

**Professors**

Robert Samuel Rogers, *Ph.D. (Princeton), F.A.A.R. Chairman;* James Nardin Truesdale, *Ph.D. (Duke);* William H. Willis, *Ph.D. (Yale).*

### Greek

201-202. Greek Tragedy*
257. Social and Cultural History of the Hellenistic World from Alexander to Augustus

### Latin

211-212. Roman Oratory*
258. Social and Cultural History of the Graeco-Roman World

## Comparative Literature

No graduate degree is offered in Comparative Literature. The following courses may serve in the minor programs of students in other departments. Consult Professor Salinger, Chairman of the Department of Germanic Languages and Literature.

201, 202. Romanticism (1964-65)
203, 204. Realism and Symbolism (Not 1964-65)
205. Foundation of Twentieth-Century European Literature (1964-65)

## Economics

The Department of Economics offers graduate work leading to the A.M. and Ph.D. degrees. A student entering graduate work in economics should have completed with satisfactory grades at least 12 semester hours of graduate work in economics, including 6 hours of Principles of Economics. Among the undergraduate courses of distinct advantage to the graduate student in economics are General Accounting, Elementary Statistics, Intermediate Economic Theory, Money and Banking, International Trade, and basic courses in philosophy, psychology, mathematics, and social sciences other than economics.

Requirements for the Ph.D. in economics include a core of courses in Mathematical Economics, Statistical Methods, Micro- and Macro-economic Theory, Economic History, and the History of Economic Thought. Economic Growth and Demography, Money and Banking, International Trade, Economic Systems, Labor Economics, Public Finance, and Industrial Organization are optional fields, of which the student elects at least three in preparation for the preliminary doctoral examination. Course requirements for the Ph.D., including a minor field, may be completed in four semesters of residence.

**Professors**

Martin Lee Black, Jr., *C.P.A., M.B.A. (Northwestern);* Frank Traver de Vyver, *Ph.D. (Princeton), Chairman;* Stephen Enke, *Ph.D. (Harvard);* Charles Elmo

Ferguson, *Ph.D. (North Carolina);* Frank Allan Hanna, *Ph.D. (Wisconsin);* Calvin Bryce Hoover, *Ph.D. (Wisconsin), Litt.D., James B. Duke Professor of Economics;* Charles Earl Landon, *Ph.D., (Illinois);* John Seneca McGee, *Ph.D. (Vanderbilt);* Robert Sidney Smith, *Ph.D. (Duke);* Joseph John Spengler, *Ph.D. (Ohio State), James B. Duke Professor of Economics.*

**Associate Professors**

David G. Davies, *Ph.D. (University of California, Los Angeles);* Hans W. Gerhard, *Dr. rer. pol. (Tübingen);* Craufurd D. W. Goodwin, *Ph.D. (Duke).*

**Assistant Professors**

Louis De Alessi, *Ph.D. (University of California, Los Angeles);* William Wallace, *Ph.D. (Illinois).*

**Courses of Instruction**

233. State and Local Finance
237-238. Statistical Methods
262. Trade Unionism and Collective Bargaining
275-276. Advanced Industrial Accounting and Management
301. Economic Analysis
304, 305 Seminar—Money and Banking
307, 308 Quantitative Analysis
311, 312. History of Political Economy
313, 314. Seminar—Economic Theory
315. Seminar—Economic Systems
316. Seminar—Economic Functions of the State
317. Seminar—Demographic Population and Resource Problems
319. Seminar—Theory and Problems of Economic Growth and Change
320. Seminar—Trade Cycles, Employment, and Income Theory
321-322. Economic Workshop—Economic Development
329. Federal Finance
330. Seminar—Public Finance
331. Seminar—Economic History
340. National Income
355. Seminar—Labor Economics
358. Seminar—Labor Market and Related Analysis
365. Seminar—International Economics
366. Seminar—Problems in International Trade and Finance
386. Seminar—Latin-American Economic Problems
388. Seminar—Industrial Organization
389. Seminar—Industrial and Governmental Problems
401. Seminar—British Commonwealth

## Education

Graduate work in Education is offered leading to the A.M., the M.Ed., the M.A.T., and the Ed.D. degrees. For each of these degrees there are specific requirements and prerequisites, all of which may be found stated in detail in the *Bulletin.* Departmental requirements and prerequisites for all of these degrees may be obtained from the Director of Graduate Studies.

From the courses listed below, plus several in related disciplines, a selection may be made which will meet North Carolina requirements for the advanced Principal's Certificate and the Superintendent's Certificate. (Some courses below are offered only in the Summer Session; see the Summer Session *Bulletin.*)

Accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.

**Professors**

Edward Claude Bolmeier, *Ph.D. (Chicago), Director of Graduate Studies;* Francis E. Bowman, *Ph.D. (Harvard);* William H. Cartwright, *Ph.D. (Minnesota), Chairman;* Sherwood Githens, Jr., *Ph.D. (North Carolina);* Everett H. Hopkins, *M.A., LL.D. (Wittenberg);* Allan S. Hurlburt, *Ph.D. (Cornell);* Wippert A. Stumpf, *Ph.D. (Chicago).*

**Associate Professors**

Robert Merle Colver, *Ed.D. (Kansas);* W. Scott Gehman, Jr., *Ph.D. (Pennsyl-*

*vania State);* Olan Lee Petty, *Ph.D. (Iowa);* Mabel F. Rudisill, *Ph.D. (Wisconsin);* R. Baird Shuman, *Ph.D. (Pennsylvania);* Henry Weitz, *Ed.D. (Rutgers).*

**Assistant Professors**

David V. Martin, *Ed.D. (Duke);* Henry L. Sublett, *Ed.D. (Virginia).*

**Courses of Instruction**

201. Teaching and Supervision of Arithmetic
203. Principles of School Administration
204. The School as an Institution
205. Curriculum Problems in Secondary Education*
210. Introduction to Educational Research
211. The Problem Child (also listed as Psychology 211)
213. Elementary School Organization and Administration*
215. Secondary Education: Principles
216. Secondary Education: Internship
217. The Psychological Principles of Education
222. The Curriculum and Materials of the Elementary Grades*
224. Teaching the Social Studies in Elementary Schools
225. The Teaching of History and the Social Studies
226. Teaching Reading in the Elementary School
228. Improvement of Instruction in the Social Studies
232. Supervision of Instruction*
234. Secondary School Organization and Administration
235. The Nature, Function, and Reorganization of the Curriculum
236. Teaching Reading in the Secondary School
237. Literature for Adolescents
238. Remedial Reading—Principles and Practice
239. Methods and Problems of Teaching English in Secondary Schools
240. Educational and Occupational Information*
241. Principles of Guidance
242. Measurement of Aptitudes, Interest, and Achievement
243 Personality Dynamics
244. Counseling Techniques
246. The Teaching of Mathematics
248. Practicum in Counseling
253. School Law
258. Educational Measurements
266. Science in the Elementary School*
276. The Teaching of High School Science
285. Audio-Visual Aids in Education*
290. Administration of School Property*
291. Public and Community Relation of Schools*
315. Seminar—Secondary School Teaching
323. Public School Finance*
333. Seminar in Higher Education*
335-336. Seminar in School Administration
350, 351. Directed Activities in School Administration
354. Seminar in School Law*

# Engineering

## Civil Engineering

The Department of Civil Engineering offers graduate work leading to the Master of Science degree. A broad approach is emphasized and fundamental principles are stressed. Narrowly specialized courses are not offered. Each graduate student, therefore, engages in a program that is designed to give him technical competence in the sciences related to his field of study, and to give him an understanding of the art of engineering, which depends on imagination and judgment. A student may specialize in one of the following fields of study: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soil engineering or structural engineering.

A *minimum* of 30 units of earned graduate credit is required for the M.S. degree; 12 in Civil Engineering or other areas of engineering, 6 in related minor work (normally mathematics or natural sciences), 6 in either the major or minor area or in another approved by the major department and by

the Dean of the Engineering School, and 6 for a research-based thesis. A student majoring in sanitary engineering may include in this related work 3 units in the Department of Sanitary Engineerng of the University of North Carolina. There is no language requirement for the M.S. degree.

A minimum prerequisite to the graduate program will be mathematics through linear differential equations, mechanics of materials, solid and fluid mechanics.

**Professors**

Earl I. Brown, II, *Ph.D. (Texas), J. A. Jones Professor of Civil Engineering, Chairman, Director of Graduate Studies;* James Lathrop Meriam, *Ph.D. (Yale);* James W. Williams, *M.S. (Harvard).*

**Associate Professors**

Edward H. Bryan, *Ph.D. (Wisconsin).*

**Visiting Associate Professor**

Sudhir Kumar, *Ph.D. (Pennsylvania State).*

**Assistant Professors**

David W. Hill, *Ph.D. (Stanford);* Don J. Wood, *Ph.D. (Carnegie Institute of Technology).*

**Courses of Instruction**

CE 202. Experimental Stress Analysis*
CE 203. Advanced Mechanics of Materials
CE 204. Theory of Plates and Shells
CE 205. Theory of Elasticity
CE 211. Behavior of Materials*
CE 231. Structural Theory and Analysis
CE 232. Reinforced Concrete Theory
CE 235. Foundation Engineering*
CE 242. Hydraulic Engineering
CE 244. Sanitary Engineering Processes*
CE 250. Engineering Analysis
CE 265. Advanced Topics in Civil Engineering*
CE 297-298. Thesis Research

## Electrical Engineering

The Department of Electrical Engineering offers graduate work leading to the M.S. and Ph.D. degrees. The program is designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, and an understanding of the art of engineering, which depends on human imagination and judgment. Students may specialize in any one of the following fields: solid-state materials and devices; ferromagnetics; superconducting circuits; instrumentation; electronics; microwaves; computers and automatic control; energy conversion; and information processing. Major credit in electrical engineering may be given for graduate level physics courses in the area of microwaves.

A *minimum* of 30 units of earned graduate credit is required for the M.S. degree: 12 in electrical engineering or other areas of engineering, 6 in related minor work (normally, mathematics or natural sciences), 6 in either the major or minor subject or in other areas approved by the major department and by the Dean of the Engineering School, and 6 for a research-based thesis. There is no language requirement for this degree.

The minimum requirements for the Ph.D. degree include: 48 units of course credits (normally 24 in electrical engineering and 24 in mathematics and physics), a reading knowledge of two foreign languages (normally French and German), and an acceptable research-based dissertation.

A minimum prerequisite to the graduate courses in electrical engineering

is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.

**Professors**

Otto Meier, Jr., *Ph.D. (Pennsylvania);* Charles Rowe Vail, *Ph.D. (Michigan), Chairman;* Thomas George Wilson, *D.Sc. (Harvard).*

**Associate Professors**

John Leslie Artley, *D.Eng. (Johns Hopkins);* Wellington Wesley Koepsel, *Ph.D. (Oklahoma State);* Harry Ashton Owen, Jr., *Ph.D. (North Carolina State), Director of Graduate Studies.*

**Adjunct Associate Professor**

Robert M. Burger, *Ph.D. (Brown).*

**Assistant Professsor**

Theo Clyde Pilkington, *Ph.D. (Duke).*

**Courses of Instruction**

EE 201. Energy Systems
EE 203, 204. Information Systems
EE 207. Network Synthesis
EE 211. Solid State Theory
EE 212. Solid State Materials
EE 213. Magnetics*
EE 215, 216. Solid-State Devices*
EE 221. Nonlinear Electromagnetics
EE 222. Nonlinear Analysis
EE 231. Nuclear Engineering*
EE 241. Feedback Systems
EE 242. Optimum Control Systems
EE 243. Nonlinear Control Systems
EE 259. Advanced Electric Energy Conversion*
EE 265. Advanced Topics in Electrical Engineering*
EE 297, 298. Thesis Research

## Mechanical Engineering

The Department of Mechanical Engineering offers graduate work leading to the degree of Master of Science. It is intended that the work for this degree provide a broad basic foundation in the art of applying science to mechanical design and analysis.

A *minimum* of 30 units of earned graduate credit is required for the M.S. degree; 12 in mechanical engineering or other areas of engineering, 6 in related minor work (normally mathematics or natural sciences), and 6 in either the major or minor subject or in another approved by the major department and by the Dean of the Engineering School, and 6 for a research-based thesis. The major requirement of 12 units in mechanical engineering is normally met by taking courses ME 201 and ME 202, plus two other courses which are so selected as to provide background for the specialized thesis-research.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

**Professors**

Van Leslie Kenyon, Jr., *M.M.E. (Delaware);* John Nelson Macduff, *M.M.E. (New York University), Chairman, Director of Graduate Studies;* James Lathrop Meriam, *Ph.D. (Yale).*

**Associate Professors**

Thomas Allen Boyle, Jr., *M.S. in M.E. (Lehigh);* Ernest Elsevier, *M.S. in M.E. (Georgia Institute of Technology).*

**Assistant Professor**

Charles Morgan Harman, *Ph.D. (Wisconsin).*

ME 201. Theoretical and Applied Mechanics
ME 202. Theoretical Thermodynamics
ME 221. Analysis of Incompressible and Compressible Fluid Flow*
ME 222. Analysis of Heat Transfer*
ME 231-232. Systems Engineering
ME 265. Advanced Topics in Mechanical Engineering*
ME 280. Nuclear Reactor Power Cycles*
ME 297, 298. Thesis Research

## English

The department offers graduate work leading to the A.M. and Ph.D. degrees. A statement of the requirements for the Ph.D. degree may be obtained from the Director of Graduate Studies.

**Professors**

Merle M. Bevington, *Ph.D. (Columbia);* Benjamin Boyce, *Ph.D. (Harvard);* Bernard I. Duffey, *Ph.D. (Ohio State);* John L. Lievsay, *Ph.D. (Washington);* Clarence Gohdes, *Ph.D. (Columbia), James B. Duke Professor of English;* Robert M. Lumiansky, *Ph.D. (North Carolina);* Holger O. V. Nygard, *Ph.D. (California), Director of Graduate Studies;* Charles Richard Sanders, *Ph.D. (Chicago);* Lionel Stevenson, *B. Litt. (Oxon.), Ph.D. (California), F. R. S. L., James B. Duke Professor of English;* Arlin Turner, *Ph.D. (Texas), Chairman;* Charles Eugene Ward, *Ph.D. (Duke).*

**Associate Professors**

Louis J. Budd, *Ph.D. (Wisconsin);* Oliver W. Ferguson, *Ph.D. (Illinois);* Simeon K. Heninger, *Ph.D. (Johns Hopkins);* Grover C. Smith, *Ph.D. (Columbia);* George W. Williams, *Ph.D. (Virginia).*

**Courses of Instruction**

203. Chaucer
207. Old English Grammar and Readings
208. History of the English Language
209. Present-day English
213. Introduction to Folklore (Not 1964-65)
215, 216. Elizabethan Drama (Not 1964-65)
217. Milton
218. Spenser (Not 1964-65)
219, 220. The Eighteenth Century
221, 222. English Literature of the Early Nineteenth Century
223, 224. English Literature of the Later Nineteenth Century
227. Literary Criticism (1964-65)
229, 230. American Literature, 1800-1865
233, 234. American Literature 1865-1920
235-236. American Literature since 1920
237. English Drama, 1642-1800 (Not 1964-65)
239. Shakespeare
244. Literary Biography (Not 1964-65)
251, 252. English Literature of the Seventeenth Century
261, 262. English Literature of the Twentieth Century
264. Major Developments in Contemporary American Poetry (Not 1964-65)
266. Recent Critical Thought
269, 270. Southern Literature (1964-65)
274. American Humor (Not 1964-65)
277. English Prose of the Sixteenth Century
278. English Non-dramatic Poetry of the Sixteenth Century
304. Studies in the Metaphysical Poets (Not 1964-65)
306. Studies in Chaucer
311. Beowulf (1964-65)
313. The Traditional Ballad and Folksong (Not 1964-65)
315. Literature of England 1100 to 1500 excluding Chaucer (Not 1964-65)
320. Medieval Romances
322. Genre Studies in Twentieth Century American Literature
330. Textual Criticism (1964-65)
331. Emerson (1964-65)
332. Whitman (Not 1964-65)
333. Hawthorne and Melville (Not 1964-65)

334. Studies in the Critical and Philosophical Ideas of Coleridge and Carlyle (Not 1964-65)
339. Studies in Shakespeare (Not 1964-65)
340. Studies in Renaissance English Prose (1964-65)
345. The Eighteenth-Century Novel (1964-65)
347. Studies in Victorian Poetry (Not 1964-65)
348. Studies in Victorian Fiction (1964-65)
351, 352. Introduction to Research
363. Studies in British Poetry of the Twentieth Century
378. Samuel Johnson's Literary Criticism and Related Topics (Not 1964-65)
100. English for Foreign Students

## Forestry

Major and minor work is offered in the scientific aspects of forestry leading to the Master of Arts and Doctor of Philosophy degrees. Work for these degrees may be pursued in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest mensuration and biometry, forest entomology, forest economics, and forest climatology and hydrology. College graduates who have had specialized training in botany or soil science and in allied basic subjects, such as physics, chemistry, geology, and zoology, may pursue graduate study and research only in the specialized fields for which their previous work has qualified them. For information on professional training in forestry see *Bulletin of the School of Forestry*.

**Professors**

Roger Fabian Anderson, *Ph.D. (Minnesota);* Ellwood Scott Harrar, *Ph.D., Sc.D. (Syracuse), Chairman;* Paul Jackson Kramer, *Ph.D. (Ohio State), James B. Duke Professor of Botany;* Aubrey Willard Naylor, *Ph.D. (Chicago);* James Granville Osborne, *B.S. (University of California);* James G. Yoho, *Ph.D. (Michigan State), Director of Graduate Studies.*

**Associate Professors**

Terry W. Johnson, Jr., *Ph.D. (Michigan);* Charles William Ralston, *Ph.D. (Duke).*

**Assistant Professors**

Kenneth Richard Knoerr, *Ph.D. (Yale);* William James Stambaugh, *Ph.D. (Yale);* John Dennis Sullivan, *Ph.D. (Michigan State);* Frank Wilson Woods, *Ph.D. (Tennessee).*

**Courses of Instruction**

223. Forest Pathology
230. Forest Entomology
241. Dendrology
243. Silvics *(Summer only)*
251. Sampling Methods in Forestry*
257. Design of Forestry Experiments and Analysis of Data*
261. Forest Soils
270. Economics of Forestry
276. Forestry Policy
290. Wood Anatomy
301, 302. Advanced Studies in Forestry
321. Research Techniques in Forest Pathology
331. Toxology of Insecticides
332. Ecology of Forest Insects
341. Forest Meteorology
342. Forest Influences
344. Micrometeorology
348. Seminar in Silvics
352. Analysis of Forest Measurements
357, 358. Research in Forestry
362. Forest Soil Physics (Not 1964-65)
366. Forest Soil Fertility
378. Seminar—Forest Economics
379. Economic Analysis in Forestry
396. Chemistry of Wood
397. Timber Physics

## Geology

For a description of the new master's degree program consult the official *Bulletin.*

## Germanic Languages and Literature

The Department of Germanic Languages and Literature offers graduate work leading to the A.M. degree. Students who expect to major in German should have had sufficient undergraduate courses in Germanic languages to enable them to proceed to more advanced work.

Students who wish to take courses in German for a minor should normally have completed a third-year course (in exceptional cases, a second-year) of college German with acceptable grades.

**Professor**

Herman Salinger, *Ph.D. (Yale), Chairman, Director of Graduate Studies*

**Associate Professors**

Leland R. Phelps, *Ph.D. (Ohio State);* Richard K. Seymour, *Ph.D. (Pennsylvania);* A. Leslie Willson, *Ph.D. (Yale).*

**Assistant Professor**

Herbert Deinert, *Ph.D. (Yale).*

**Courses of Instruction**

201, 202. Goethe (1964-65)
203, 204. Eighteenth Century*
205, 206. Middle High German
207, 208. German Romanticism (Not 1964-65)
209, 210. Kleist, Grillparzer, and Hebbel*
211, 212. Heinrich Heine (Not 1964-65)
213. Literature of the Empires, 1866-1918. (1964-65)
214. German Literature since 1918 (1964-65)
215. Seventeenth-Century Literature (Not 1964-65)
216. History of the German Language*
218. The Teaching of German*
———. Graduate Reading Course

## History

A candidate for the degree of Doctor of Philosophy is required to prepare himself for examination in five fields, of which four shall normally be within history and of which one must be in American history or in the history of Western Europe. The choice and delimitation of fields is determined in consultation with his supervisor and the Director of Graduate Studies. The Department offers graduate instruction in Ancient History; Medieval Europe; Modern Europe; American History; England and the Commonwealth; Russia; Latin America; the Far East in the modern period; South Asia in the modern period; military history; and historiography.

Students may receive credit for either semester of a hyphenated course without taking the other semester if they obtain written permission from the instructor and the Director of Graduate Studies.

**Professors**

John Richard Alden, *Ph.D. (Michigan);* Joel G. Colton, *Ph.D. (Columbia);* Robert Crane, *Ph.D. (Yale);* John Shelton Curtiss, *Ph.D. (Columbia);* Arthur Bowles Ferguson, *Ph.D. (Cornell);* William Baskerville Hamilton, *Ph.D. (Duke);* Irving B. Holley, Jr., *Ph.D. (Yale);* John Tate Lanning, *Ph.D. (California);* Alan Krebs Manchester, *Ph.D. (Duke);* Ernest William Nelson, *Ph.D. (Cornell);* Harold Talbot Parker, *Ph.D. (Chicago), Director of Graduate Studies;* Robert Samuels Rogers, *Ph.D. (Princeton);* Theodore Ropp, *Ph.D. (Harvard);* Richard L. Watson, Jr., *Ph.D. (Yale), Chairman;* Robert Hilliard Woody, *Ph.D. (Duke).*

**Associate Professors**

Frances Dorothy Acomb, *Ph.D. (Chicago);* Robert F. Durden, *Ph.D. (Princeton);* Frederic B. M. Hollyday, *Ph.D. (Duke);* William Evans Scott, *Ph.D. (Yale);* Charles Young, *Ph.D. (Cornell).*

**Assistant Professors**

Calvin DeArmond Davis, *Ph.D. (Indiana);* Donald Gillin, *Ph.D. (Stanford);* Warren Lerner, *Ph.D. (Columbia).*

203-204. The United States, 1850-1900
205-206. The United States in the Twentieth Century
209-210. Constitutional History of the United States, 1760 to the Present (Not 1964-65)
212. Recent Interpretations of United States History
213-214. The Old South (Not 1964-65)
215-216. Foreign Policy and Diplomacy of the United States
217, 218. Europe Since 1870
221-222. The Age of the Renaissance
223-224. The Old Regime and the French Revolution, 1661-1815
225-226. The Age of the Reformation (Not 1964-65)
227, 228. Europe in the Nineteenth Century (Not 1964-65)
229. Recent Interpretations of Modern European History
231-232. The Hispanic Colonies and Republics in America
233-234. The Institutional, Cultural, and Social History of Hispanic America
235, 236. European Expansion Overseas
237-238. Europe in the Middle Ages
241-242. Nationalism and Communism in the Far East
245-246. War in the Modern World
247, 248. The History of Modern India and Pakistan, 1757-1947
249-250. Social and Intellectual History of the United States (Not 1964-65)
251-252. Recent European History
257. Social and Cultural History of the Hellenistic World from Alexander to Augustus
258. Social and Cultural History of the Graeco-Roman World
259-260. The Emergence of the New South, 1865 to the Present
261-262 Russia in the Twentieth Century
263-264. American Colonial History and the Revolution, 1607-1789
267, 268. From Medieval to Modern England
269. British History from 1714 to 1867
270. Great Britain and the Commonwealth of Nations, 1867 to the Present
297. The British Empire from the American Revolution to the Boer War
298. The Commonwealth in the Twentieth Century
303-304. The United States in the Twentieth Century
305-306. Seminar—History of England and the British Empire
307-308. Seminar—United States History
309-310. Seminar—American Colonial and Revolutionary History
315-316. Seminar—Southern History
317-318. Seminar—Modern European History
321-322. Seminar—History of Spain, Hispanic American, and Inter-American Relations
343-344. Seminar—History of American Foreign Relations
347-348. Seminar on Recent India
401. Seminar on the British Commonwealth
410. Seminar on Southern Asia
312. Seminar—The Teaching of History in College
320. Historiography

## Hospital Administration

A program leading to the M.H.A. degree provides preparation for a career of administration in hospitals and other health agencies to specially selected graduate students. Admission to this program is limited to 12 students a year, and selection is based upon suitability for the practice of management as well as capability for graduate study. This program normally requires 24 months to complete, as it includes a 12-month administrative residency under faculty supervision in hospitals and related institutions as well as an academic program of 36 graduate units, of which 18 are in Hospital Administration and 18 in designated courses in Economics, Political Science, and Sociology.

**Professor**

Ray E. Brown, *M.B.A. (Chicago);* Charles H. Frenzel, *A.B. (Duke).*

**Associate Professor**

Louis E. Swanson, *A.B. (Hamline).*

**Assistant Professor**

Donald S. Smith II, *M.H.A. (Minnesota).*

**Courses of Instruction**

201. History and Development of Hospitals and Other Health Agencies
203-204. Principles of Organization and Management of Hospitals and Other Health Agencies
211-212. Seminars in Health Administration
215. Administrative Residency

## Mathematics

Graduate work in the Department of Mathematics is offered leading to the A.M. and Ph.D. degrees. The student, in his undergraduate work, must have had courses in differential and integral calculus, and at least 6 semester hours of other courses in mathematics on the junior or senior level.

The A.M. degree with a major in mathematics is awarded primarily on the basis of scholarship. Of the 24 units of course work required for this degree, 18 units must be taken in the Department of Mathematics.

The Ph.D. degree in mathematics is awarded upon the demonstration of ability and training in research. The original dissertation, therefore, is the most important of the formal requirements for this degree.

Since a reading knowledge of French, German, and Russian is highly desirable for the student of mathematics, he should satisfy the language requirements in two of these languages as early as possible.

**Professors**

Leonard Carlitz, *Ph.D. (Pennsylvania);* Francis George Dressel, *Ph.D. (Duke);* William Whitfield Elliot, *Ph.D. (Cornell);* John Jay Gergen, *Ph.D. (Rice), Chairman;* Francis Joseph Murray, *Ph.D. (Columbia);* John Henderson Roberts, *Ph.D. (Texas);* Joseph Miller Thomas, *Ph.D. (Pennsylvania).*

**Associate Professors**

Thomas Muir Gallie, Jr., *Ph.D. (Rice);* Thomas D. Reynolds, *Ph.D. (Duke);* Joseph Robert Shoenfield, *Ph.D. (Michigan);* Seth L. Warner, *Ph.D. (Harvard), Director of Graduate Studies.*

**Assistant Professors**

Marion Ritchie Bryson, *Ph.D. (Iowa State);* Donald Smiley Burdick, *Ph.D. (Princeton);* David William Dean, *Ph.D. (Illinois);* Lowell Arthur Hinrichs, *Ph.D. (Oregon);* Reece Thomas Harris, Jr., *Ph.D. (Illinois);* John A. Kelingos, *Ph.D. (Michigan);* Olaf Stackelberg *Ph.D. (Michigan).*

**Instructor**

Richard Arthur Scoville, *Ph.D. (Yale).*

**Courses of Instruction**

213-214. Modern Algebra (1964-65, Retired Officers Program only)
215-216. Intermediate Analysis (1964-65, Retired Officers Program only)
217-218. Analysis
221. Digital Computer
222. Introduction to Numerical Analysis
225. Theory of Equations (Not 1964-65)
227-228. Theory of Numbers (1964-65)
229-230. Algebraic Numbers (Not 1964-65)
233. Statistical Methods
234. Sample Designs
235-236. Abstract Algebra
244. Design of Experiments
245-246. Combination Analysis (Not 1964-65)
247-248. Arithmetic of Polynomials (1964-65)
253-254. Differential Geometry*
271-272. Introductory Topology
283. Probability for Engineers
285. Applied Mathematical Methods I
286. Applied Mathematical Methods II
287-288. Foundations of Mathematics (also listed as Philosophy 287-288) (Not 1964-65)

291-292. Theory of Functions
325-326. Real Variable
327-328. Partial Differential Equations (Not 1964-65)
331-332. Advanced Topics in Complex Variables (1964-65)
333-334. Analytic Theory of Numbers (Not 1964-65)
337-338. Existence Theorems*
343-344. Ordinary Differential Equations*
371-372. Dimension Theory*
383-384. Lie Groups and Algebras (Not 1964-65)
395-396. Topological Algebra (1964-65)

## Microbiology and Immunology

**Professors**

D. Bernard Amos, *M.D. (Guys Hospital, London);* Joseph Willis Beard, *M.D. (Vanderbilt);* Norman Francis Conant, *Ph.D. (Harvard), James B. Duke Professor of Microbiology, Chairman;* John E. Larsh, Jr., *Sc.D. (Johns Hopkins);* Ralph Wayne Rundles, *M.D., Ph.D. (Cornell);* David Tillerson Smith, *M.D. (Johns Hopkins), Litt. D., James B. Duke Professor of Bacteriology.*

**Associate Professors**

Eugene D. Day, *Ph.D (Delaware);* Samson R. Gross, *Ph.D. (Columbia), Director of Graduate Studies;* John R. Overman, *M.D. (Duke);* Mrs. Hilda Pope Willett, *Ph.D. (Duke).*

**Assistant Professors**

Richard S. Metzgar, *Ph.D. (Buffalo);* Suydam Osterhout, *M.D., Ph.D. (Rockefeller Institute);* Chester M. Zmijewski, *Ph.D. (Buffalo).*

**Instructor**

Armand G. Eiring, *Ph.D. (Duke).*

**Courses of Instruction**

(*See* Medical School, Page 59)
M211. Hematology
M221. Bacteriology and Immunology
M291. Medical Parasitology
231. Fundamentals of Immunology
301. Principles and Techniques of Mammalian Cell Culture
302. Microbial Genetics
303. Animal Viruses and Animal Virus Diseases
310. Microbial Physiology
311. Advanced Immunology
312. Cancer Immunology
313. Immunohematology
314. Immunochemistry
315. Methods in Immunology
316. Transplantation Immunity and Immunogenetics
323. Readings in Bacteriology and Immunology
324. Research Seminar on Viruses
325. Medical Mycology
326-327 Microbiology Seminar
328. Seminar in Immunology

## Philosophy

The Department of Philosophy offers graduate work leading to the A.M. and Ph.D. degrees. Tutorial work complements formal instruction. Students may specialize in any of the following fields: the History of Philosophy; Logic; Philosophy of Science; Epistemology; Metaphysics; Philosophical Analysis; Ethics; Aesthetics; Political Philosophy; and Philosophy of Law. Applicants for admission should offer scores of the Graduate Record Examination or the Miller Analogies Test. Scores are required of applicants for an award.

Individual programs of study are developed for each student. The following requirements, however, are fundamental: (1) In February of their first year new graduate students in philosophy who are not then taking the preliminary examinations for the Ph.D. are required to take three qualifying examinations: one in the history of philosophy, ancient and modern; one on a central philosophical topic, treated systematically; and one in logic, both

classical and symbolic. The examination in logic will be waived if, during the first semester, a student has passed with a grade of E or G Philosophy 331c, Logic. A student's achievement on these examinations will be regarded as indicative of his ability to undertake advanced graduate work. (2) Preliminary examinations for the Ph.D., which may be taken only after a student has met the language requirements for that degree, should be taken during the first year of study beyond the A.M. degree, but in any case not later than the end of the second year. In these examinations students are expected to combine historical knowledge with critical understanding.

Work in a minor field outside of the Department, but not necessarily confined to any one department, must include six units for the A.M. or the Ph.D. and may include more as a student's program requires or permits.

**Professors**

Charles A. Baylis, *Ph.D. (Harvard), Chairman;* Glenn Robert Negley, *Ph.D. (Chicago);* William Bernard Peach, *Ph.D. (Harvard);* Paul Welsh, *Ph.D. (Cornell), Director of Graduate Studies.*

**Assistant Professors**

Robert W. Binkley, *Ph.D. (Minnesota);* Marshall Spector, *Ph.D. (Johns Hopkins).*

**Courses of Instruction**

202. Philosophy of Art
203. Contemporary Ethical Theories
205. Philosophy of History
208. Political Values
211. Plato
217. Aristotle
219. Kant
225. British Empiricism
227. Continental Rationalism
228. Recent and Contemporary Philosophy
229. American Pragmatism
230. The Meaning of Religious Language (also listed as Religion 230)
233. Introduction to the Philosophy of Science (Not 1964-65)
234. Philosophy of Science (Not 1964-65)
235. Philosophy and the Sciences (1964-65)
236. Special Problems in the Philosophy of Science (1964-65)
241. Logic*
246. General Semantics and Theory of Language*
250. Philosophical Analysis
252. Metaphysics
287-288. Foundations of Mathematics (also listed as Mathematics 287-288)
291, 292. Critical Philosophy
331, 332. Seminar in Special Fields of Philosophy

## Physics

The Department of Physics offers graduate work leading to the A.M. and Ph.D. degrees. Course work is designed to give a broad basic foundation in classical and modern physics. All graduate students will be expected to acquire a thorough knowledge of the various branches of classical physics and some familiarity with modern physics and with basic laboratory skills. They will be required to take such course work in the 200-number courses as may be necessary to obtain this foundation.

The student will be required to take such course work as will best be adapted to the kind of work he will subsequently specialize in and to the kind of research he will undertake. The choice of minor will be similarly determined.

Since a practical reading knowledge of French and German is highly desirable for the student of physics, he should satisfy these language requirements as early as possible.

**Professors**

L. C. Biedenharn, Jr., *Ph.D. (Massachusetts Institute of Technology);* Henry A. Fairbank, *Ph.D. (Yale), Chairman;* Earle C. Fowler, *Ph.D. (Harvard);* Eugene Greuling, *Ph.D. (Indiana), Director of Graduate Studies;* Walter Gordy, *Ph.D. (North Carolina), LL.D., D. H. C., James B. Duke Professor of Physics;* Harold W. Lewis, *Ph.D. (Duke);* Henry W. Newson, *Ph.D. (Chicago);* Walter McK. Nielsen, *Ph.D. (Minnesota), James B. Duke Professor of Physics;* Hertha D. E. Sponer, *Ph.D. (Gottingen).*

**Associate Professor**

Horst Meyer, *D.Sc. (Geneva).*

**Visiting Associate Professor**

Hermann R. Robl, *Dr. habil. (Vienna).*

**Assistant Professors**

Edward Bilpuch, *Ph.D. (North Carolina);* Lawrence E. Evans, *Ph.D. (Johns Hopkins);* Ichiro Miyagawa, *Ph.D. (Tokyo);* Russell Roberson, *Ph.D. (Johns Hopkins);* David S. Onley, *D.Phil. (Oxford);* Dwight P. Saylor, *Ph.D. (Rochester);* Frank R. Tangherlini, *Ph.D. (Stanford);* David Ronald Tilley, *Ph.D. (Johns Hopkins);* Richard L. Walter, *Ph.D. (Notre Dame).*

**Instructors**

A. Brooks Harris, *Ph.D. (Harvard);* Manfred Winnewisser, *Ph.D. (Technical University, Karlsruhe).*

**Courses of Instruction**

201-202. Mechanics
213-214. Contemporary Physics
217-218. Advanced Physics Laboratory
219. Electricity and Magnetism
220. Advanced Electronics
221-222. Theoretical Physics
303. Thermodynamics
304. Statistical Mechanics (1964-65)
306. Low Temperature Physics
309. Solid State (Not 1964-65)
315-316. Principles of Quantum Theory
318-319. Electromagnetic Field Theory
323. Theory of Atomic Spectra (1964-65)
324. Theory of Molecular Spectra (Not 1964-65)
331. Microwave Radiation (1964-65)
335. Microwave Spectroscopy (Not 1964-65)
341. Advanced Topics in Quantum Theory (Not 1964-65)
343. Nuclear Physics (1964-65)
344. Advanced Nuclear Physics (Not 1964-65)
345. High Energy Physics (1964-65)
346. Topics in Theoretical Physics*
351-352. Seminar

## Physiology and Pharmacology

**Professors**

Frederick Bernheim, *Ph.D. (Cambridge);* Frank Gregory Hall, *Ph.D. (Wisconsin);* Eugene M. Renkin, *Ph.D. (Harvard);* Daniel C. Tosteson, *M.D. (Harvard), Chairman.*

**Associate Professors**

J. J. Blum, *Ph.D. (Chicago);* William E. DeTurk, *Ph.D. (Duke);* Paul Horowicz, *Ph.D. (Johns Hopkins);* Wayland Elroy Hull, *Ph.D. (Duke);* Jack L. Kostyo, *Ph.D. (Cornell), Director of Graduate Studies;* E. Croft Long, *Ph.D. (London);* John W. Moore, *Ph.D. (Virginia).*

**Associate Research Professor**

Bodil Schmidt-Nielsen, *D.D.S., Dr.Odont., Dr.Phil. (Copenhagen).*

**Assistant Professors**

Thomas J. McManus, *M.D. (Boston University);* Athos Ottolenghi, *M.D. (Pavia, Italy);* John V. Salzano, *Ph.D. (Iowa).*

(*See* Medical School, p. 59)
M260. Cellular Aspects of Drug Action
M261-262. Human Physiology
M271. Contemporary Physiology
M279. Introductory Seminar in Physiology
M365. Respiration and Aero-Physiology*
M369. Pharmacology, Mode of Action of Drugs
M370. Seminar
M371. Topics in Pulmonary and Cardiovascular Physiology (1964-65)
M372. Research
M373. Cellular Endocrinology (1964-65)
M375. Physiology of Excitable Cells
M377. Cellular Transport Processes (Not 1964-65)
M404. Interdisciplinary Seminar in the Physiological and Anatomical Bases of Behavior (also listed as Anatomy M404 and Psychology 404)

## Political Science

The Department of Political Science offers graduate work leading to the A.M. and Ph.D. degrees. Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree.

Instruction is designed to prepare the student for teaching, for government service, and for other work related to public affairs. Before undertaking graduate study in political science, a student is ordinarily expected to have completed at least 12 semester hours of course work in political science, including some work in American government.

Fields of political science in which instruction is at present offered for candidates for the degree of Doctor of Philosophy are the following: American Government and Constitutional Law; Comparative Government (with special reference to European Institutions, Southern Asia, or Commonwealth Institutions); Political Theory; American State and Local Government; International Law and Organization; Public Administration; Political Parties and Voting Behavior. Candidates for the degree of Doctor of Philosophy who propose to major in political science must elect five fields, including Comparative Government and Political Theory; at least one of the five fields must be taken in a department other than the Department of Political Science.

**Professors**

Ralph Braibanti, *Ph.D. (Syracuse);* Robert Taylor Cole, *Ph.D. (Harvard), James B. Duke Professor of Political Science;* Robert Howe Connery, *Ph.D. (Columbia);* John Hamilton Hallowell, *Ph.D. (Princeton);* Robert Stanley Rankin, *Ph.D. (Princeton), Chairman;* Robert Renbert Wilson, *Ph.D. (Harvard), LL.D., James B. Duke Professor of Political Science, Director of Graduate Studies.*

**Visiting Professors**

Wladyslaw W. Kulski, *Dr.jur. (University of Paris);* Malcolm Edwin Jewel, *Ph.D. (Pennsylvania State).*

**Associate Professors**

Hugh Marshall Hall, *Ph.D. (Texas);* Richard Heald Leach, *Ph.D. (Princeton);* Jesse Harris Proctor, *Ph.D. (Harvard);* Allan P. Sindler, *Ph.D. (Harvard).*



207. American Constitutional Law and Theory
208. American Constitutional Law and Current National Problems
209. Problems in State and Local Government in the United States
221. International Public Organization
223. Political Thought to the Seventeenth Century
224. Modern Political Theory
225, 226. Comparative Government and Politics

227-228. International Law
229. Recent and Contemporary Political Theory
230. American Political Institutions
231. American Political Theory*
234. Civil-Military Relationships in American Government*
235. The British Commonwealth*
241. Administrative Management
242. National Administration
244. Administrative Law and Process
246. Government Administration and Public Policy
250. Comparative Government and Politics—Southern Asia I
251. Comparative Government and Politics—Southern Asia II
275. The National Party System
276. Comparative State Parties and Politics
291. Problems of Municipal Government
292. Municipal Administration
301-302. Departmental Graduate Seminar
310. Seminar—State Government
321, 322. Seminar—Political Theory
325, 326. Seminar—Comparative Government
327, 328. Seminar—International Law
330. Seminar—Comparative Governments of Asia
341. Seminar—Public Administration*
376. Seminar—Political Behavior
401. Seminar on the British Commonwealth
410. Seminar on Southern Asia

## Psychology

The Department offers work leading to the A.M. and Ph.D. degrees. For the Ph.D. degree the areas of concentration are: theoretical experimental psychology, including physiological and comparative psychology; social psychology; and personality clinical psychology. All fields of specialization presuppose thorough preparation in the general methods, data, and theories of psychology. Programs of study are typically arranged to provide this common background in the first year or two, with increasing specialization in course work and research in subsequent years. Early in the second year of residence, the Ph.D. student is expected to have planned his further program of specialized studies; by the end of the second year, when the preliminary is normally taken, the doctoral dissertation plan should be formulated. An original dissertation demonstrating independent research competence and scholarship is the most important formal requirement for the Ph.D. degree.

Students specializing in clinical psychology undertake field work in a variety of settings, and an integral part of this program is a one-year internship in an approved and appropriate institution. Clinical internship is arranged for the third year of study or later year, depending on the student's progress and needs.

Minor work in a variety of fields is available, but the areas most relevant to graduate work in psychology are the biological sciences (zoology, neuroanatomy, physiology), mathematics and statistics, sociology and anthropology, and philosophy of science.

Further details concerning the program of studies in psychology may be obtained from the Director of Graduate Studies in Psychology.

**Professors**

Donald Keith Adams, *Ph.D. (Yale);* Irving Emanual Alexander, *Ph.D. (Princeton);* Bingham Dai, *Ph.D. (Chicago);* Irving Thomas Diamond, *Ph.D. (Chicago);* Norman Guttman, *Ph.D. (Indiana), Director of Graduate Studies;* Edward Ellsworth Jones, *Ph.D. (Harvard);* Gregory Adams Kimble, *Ph.D. (Iowa);* Sigmund Koch, *Ph.D. (Duke);* Karl Edward Zener, *Ph.D. (Harvard), Chairman.*

**Associate Professors**

Katharine May Banham, *Ph.D. (Montreal);* Charles Alan Boneau, *Ph.D. (Duke);* Lloyd Joseph Borstelmann, *Ph.D. (California);* Jack Williams Brehm, *Ph.D.*

*(Minnesota);* Wally Reichenberg-Hackett, *Ph.D. (Vienna);* Michael Arthur Wallach, *Ph.D. (Harvard).*

**Associate Research Professor**

Mercedes Gaffron, *M.D. (Munich), Ph.D. (Berlin).*

**Assistant Professors**

John Cooley Altrocchi, *Ph.D. (California);* Robert Charles Carson, *Ph.D. (Northwestern);* Robert Porter Erickson, *Ph.D. (Brown);* Donald Greenwood, *Ph.D. (Harvard);* Irwin Kremen, *Ph.D. (Harvard);* Martin Lakin, *Ph.D. (Chicago);* Walter Dorn Obrist, *Ph.D. (Northwestern);* Harold Schiffman, *Ph.D. (Princeton).*

**Lecturers**

Sanford Irwin Cohen, *M.D. (Chicago);* Herbert Floyd Crovitz, *Ph.D. (Duke);* Carl Eisdorfer, *Ph.D. (New York University);* Ila Gehman, *Ed.D. (Pennsylvania State);* Barry M. Shmavonian, *Ph.D. (Washington);* George Gustav Somjen, *M.D. (New Zealand).*

**Courses of Instruction**

201, 202. The Field of Psychology
203. Psychology of Perception
204. Comparative Psychology
209. Experimental Methods in Psychology
210. Cognition and Higher Mental Processes*
213, 214. Conditioning and Learning
215. Developmental Psychology
216. Biological Psychology
217. Research Methods in Social Psychology
218. Social Psychology
234. Seminar in Personality
236. Theoretical Psychology
237. Functional Neurophysiology
238. The Electroencephalogram and Psychological Function
245, 246. Personality Theory
247, 248. Personality Assessment
253, 254. Personality Development
265. Fundamental Statistical Applications in Psychological Research
266. Advanced Statistical Applications in Psychological Research
271. Selected Problems* (Spring 1964, Psycholinguistics)
282. Introduction to Methods of Psychotherapy
292. The History of Psychology
293. Sensation and Perception (Spring 1964)
305. Psychopathology
306. Seminar—Developmental Psychology
309. Seminar—Learning
310. Seminar—Perception
311. Seminar—Instrumental Behavior
312. Seminar—Theoretical Psychology
316. Seminar—Social Psychology
318. Seminar—Social Influence
324. Seminar—Behavioral Studies of the Brain
335-336. Clinical Psychology Practicum
337. Seminar—Sensory Discrimination
341. Principles of Psychotherapy, I
342. Principles of Psychotherapy, II
343, 344. Advanced Seminar in Clinical Psychology*
371. Pre-School Behavior Problems*
404. Interdisciplinary Seminar in the Physiological and Anatomical Bases of Behavior (also listed as Anatomy M404 and Physiology M404)*

## Religion

The Department of Religion offers graduate work leading to the A.M. and Ph.D. degrees. Students may major in one of three fields: (1) Biblical Studies; (2) Historical Studies and (3) Systematic and Contemporary Studies.

In addition to course work in these major fields, students will take such other courses in cognate fields as will contribute to the enrichment of their major studies. This minor requirement may be fulfilled either by work in a cognate department, such as Classical Studies, History, or Political Science, or by work in a cognate field within the Department of Religion other than the field of major concentration.

The program of doctoral studies presumes a grounding in religion such as is normally derived from the course content of theoretical subjects of a

seminary curriculum. Candidates for admission to the doctoral program are favored, therefore, who hold a B.D. degree from an accredited seminary or who have had at least two years of seminary study beyond the B.A. degree. Students applying for graduate work in religion directly from an undergraduate program should have had a strong undergraduate major in religion, and will be accepted for the Ph.D. program only on the condition of satisfactory completion of the M.A. degree with the department.

Candidates for the Ph.D. degree must complete the language requirements in both French and German not later than the beginning of the second year of residence.

**Professors**

Hugh Anderson, *B.D., Ph.D. (Glasgow);* W. Waldo Beach, *B.D., Ph.D. (Yale), Director of Graduate Studies;* Kenneth Willis Clark, *B.D., Ph.D. (Chicago);* Robert Earle Cushman, *Ph.D. (Yale);* Ray C. Petry, *Ph.D. (Chicago), LL.D. (Manchester);* James L. Price, *B.D., Ph.D. (Cambridge);* William Franklin Stinespring, *Ph.D. (Yale).*

**Associate Professors**

Frank Baker, *B.D., Ph.D. (Nottingham);* Stuart C. Henry, *B.D., Ph.D. (Duke);* Frederick L. Herzog, *Ph.D. (Princeton);* Creighton Lacy, *B.D., Ph.D. (Yale);* William H. Poteat, *B.D., Ph.D. (Duke).*

**Assistant Professors**

Egil Grislis, *B.D., Ph.D. (Yale);* Hans J. Hillerbrand, *Ph.D. (Erlangen);* Robert Osborn, *B.D., Ph.D. (Drew);* Charles K. Robinson, *B.D., Ph.D. (Duke);* John Strugnell, *M.A. (Oxon.);* Herbert Sullivan, *Ph.D. (Chicago).*

**Courses of Instruction**

## Field I. Biblical Studies

201-202. First Hebrew
207-208. Second Hebrew
209. Biblical Theology
217. The New Testament in Greek
226. Exegesis of the Greek New Testament I
227. Exegesis of the Greek New Testament II
228. The Theology of the Gospel and Epistles of John
301. The Theology of the Dead Sea Scrolls
302. Studies in the Intertestamental Literature
304. Aramaic
305. Third Hebrew
306. Language and Literature of the Dead Sea Scrolls
307. Syriac
309. History of the Ancient Near East
310. Old Testament Prophecy
317. The Synoptic Gospels
318. Textual Criticism of the New Testament
340-341. Seminar in the New Testament

## Field II. Historical Studies

234. The Theology of Thomas Aquinas
240. The Theology of Richard Hooker
250-251. Studies in Modern Church History (Not 1964-65)
260. Seminar: Wesley Studies
280. The History of Religions
296. Religion on the American Frontier
322. Nineteenth-Century European Theology (Not 1964-65)
331. The Social Message of the Early and Medieval Church (Not 1964-65)
332. The Medieval Church
334. Church Reformers and Christian Unity (Not 1964-65)
336. Christian Mysticism in the Middle Ages
337. The Theology of Martin Luther
338. The Theology of John Calvin
339. Left-Wing Movements of the Reformation (Not 1964-65)
387. Christian Ethics and Social Philosophy
391. Historical Types of Christian Ethics I (Not 1964-65)
392. Historical Types of Christian Ethics II (Not 1964-65)
395. Christian Thought in Colonial America
396. Liberal Traditions in American Theology

### Field III. Systematic and Contemporary Studies

230. The Meaning of Religious Language (also listed as Philosophy 230)
231. Seminar in Christianity and Contemporary Thought
292. Christian Ethics and International Relations
303. Dogma and the Problem of History
320. Seminar: Friedrich Schleiermacher (Not 1964-65)
325. Philosophical Theology I
326. Philosophical Theology II
328. Twentieth-Century European Theology
333. Marxist Ideology and Christian Faith
380. Existentialism
385. Religion in American Literature
386. Theological Trends in the World Church
389. Christian Ethics and Contemporary Culture
390. Current Problems in Christian Ethical Theory
394. Christianity and the State
397. Contemporary American Theology
398. Colloquium on the College and University Teaching of Religion

## Romance Languages

The Department of Romance Languages offers graduate work leading to the A.M. and Ph.D. degrees. In order to undertake graduate study in this Department, the student should normally have credit for four years of college courses in the chosen language, or 18 semester hours beyond the conventional two units offered at entrance to college. In addition to this minimum requirement, the student should have had one semester of review in composition and grammar.

It is recommended that candidates for the A.M. degree take a second Romance language as the minor subject.

A candidate for the Ph.D. degree will be required to take some training in Romance linguistics, the amount to be determined by the Department upon consideration of the student's preparation in the field, and a course in methods of literary scholarship.

**Professors**

Juan R. Castellano, *D.F.L. (Madrid);* Clifton Cherpack, *Ph.D. (Johns Hopkins), Director of Graduate Studies;* Gifford Davis, *Ph.D. (Harvard), Chairman;* Neal Dow, *Ph.D. (Pennsylvania);* John Morton Fein, *Ph.D. (Harvard);* Richard Lionel Predmore, *D.M.L. (Middlebury);* Bruce W. Wardropper, *Ph.D. (Pennsylvania).*

**Associate Professors**

Thomas Howard Cordle, *Ph.D. (Yale);* Richard Babson Grant, *Ph.D. (Harvard);* Patrick R. Vincent, *Ph.D. (Johns Hopkins).*

**Assistant Professors**

Alexander Hull, *Ph.D. (Washington);* Marcel Tétel *Ph.D. (Wisconsin).*

### French

**Courses of Instruction**

209. Advanced Composition and Syntax
210. French Phonetics
213, 214. French Classicism (1964-65)
219. Old French (Not 1964-65)
221, 222. The Nineteenth-Century French Novel (1964-65)
225, 226. From Renaissance to Baroque in French Literature of the Sixteenth Century (1964-65)
241, 242. French Literature and Thought in the Age of Enlightenment (1964-65)
245, 246. French Literature of the Twentieth Century (Not 1964-65)
311, 312. French Seminar
——. Graduate Reading Course

## Spanish

**Courses of Instruction**

251. The Origins of the Spanish Novel (Not 1964-65)
252. Spanish Lyric Poetry before 1700 (1964-65)
253. The Origins of the Spanish Theatre (Not 1964-65)
255. Modern Latin-American Literature (1964-65)
256. Contemporary Latin-American Literature (Not 1964-65)
258. Old Spanish (Not 1964-65)
259. Spanish Phonetics
260. Advanced Composition and Syntax
261. Nineteenth-Century Novel (1964-65)
264. Modern and Contemporary Spanish Theatre (1964-65)
265. Golden Age Literature: Cervantes (Not 1964-65)
266. Golden Age Literature: The Drama (Not 1964-65)
275. Contemporary Spanish Literature: Essays and Lyric Poetry (Not 1964-65)
276. Contemporary Spanish Literature: The Novel (Not 1964-65)
321, 322. Hispanic Seminar

## Romance Languages

**Courses of Instruction**

R. L. 211. Approaches to Romance Literature
R. L. 218. The Teaching of Romance Languages
R. L. 224. Romance Linguistics

## Russian

No graduate degree is now offered in Russian. The following course may serve in the minor programs of students in other departments.

**Associate Professor**

Bronislas de Leval Jezierski, *Ph.D. (Harvard).*

**Courses of Instruction**

201, 202. The Novelists of Nineteenth-Century Russia

## Sociology and Anthropology

The Department offers graduate work leading to the A.M. and Ph.D. degrees in Sociology. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. Applicants for admission should submit scores on the Graduate Record Examination.

Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree. Candidates for the Ph.D. degree are expected to have a broad background in the vasious aspects of sociology—substantive, theoretical, and empirical. The program of each candidate is determined by a committee which reviews his previous work and sets the specific requirements to be met. These requirements will include work in related fields such as psychology, philosophy, mathematics, economics, or political science. Emphasis is placed on the completion of the dissertation, directed by a member of the staff, demonstrating competence and independence in the investigation of an original and significant problem.

Further details of the program, the departmental facilities, the staff, and

various stipends available are described in a brochure which may be obtained from the Director of Graduate Studies in Sociology.

**Professors**

Kurt W. Back, *Ph.D. (Massachusetts Institute of Technology);* Weston LaBarre, *Ph.D. (Yale);* John C. McKinney, *Ph.D. (Michigan State), Chairman;* Edgar Tristram Thompson, *Ph.D. (Chicago).*

**Associate Professors**

Alan C. Kerckhoff, *Ph.D. (Wisconsin), Director of Graduate Studies;* George L. Maddox, Jr., *Ph.D. (Michigan State);* Jack J. Preiss, *Ph.D. (Michigan State);* William L. Rowe, *Ph.D. (Cornell);* Donald Francis Roy, *Ph.D. (Chicago);* Joel Smith, *Ph.D. (Northwestern).*

**Assistant Professors**

Ida Harper Simpson, *Ph.D. (North Carolina);* Halliman H. Winsborough, *Ph.D. (Chicago).*

**Courses of Instruction**

232. Primitive Religion
234. Personality and Society
236. Personality and Culture
241. Social Stratification
242. The Sociology of Occupations and Professions
243. Population Dynamics and Social Change
245. Deviant Social Behavior*
247. Community and Society
253. Social Institutions
255. Race and Culture
275. Social Attitudes and Individual Behavior
278. Social Structure and the Life Cycle*
281. Development of Sociological Theory
282. Principles of Sociological Analysis*
290-291. Methods of Sociological Research
297. Statistical Analysis in Sociology
330. Seminar in Anthropology
341. Special Problems of Complex Social Systems*
  (a) Industrial and Professional Systems
  (b) Mass Communications
  (c) Urban Society
  (d) Human Ecology
351, 352. Seminar in Social Organization
373, 374. Social Psychological Issues in Sociology
385, 386. Seminar in Sociological Theory
397, 398. Seminar in Special Research Problems*
410. Seminar in the Government, History, and Social Structure of India and Pakistan*

## Zoology

To undertake study toward an advanced degree in zoology, a student should have completed an undergraduate major in zoology or its equivalent. This normally amounts to 24 or more hours of course work distributed among various fields of zoology. The department recognizes the trend in modern biology towards interdisciplinary research, and part of the zoology requirements may be replaced by advanced work in chemistry, mathematics, physics, etc.

Required work for the A.M. degree ordinarily includes 12 units of advanced course work in zoology, 6 units of course work in a minor department-ment, and an additional 6 units of advanced course work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which

reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and a dissertation based on original work. Minor work is available in many fields, including anatomy, biochemistry, botany, chemistry, physics, physiology, and psychology.

**Professors**

Cazlyn Green Bookhout, *Ph.D. (Duke);* Irving Emery Gray, *Ph.D. (Wisconsin);* John R. Gregg, *Ph.D. (Princeton);* Edward Charles Horn, *Ph.D. (Princeton), Chairman;* Robert J. Menzies, *Ph.D. (S. California);* Knut Schmidt-Nielsen, *Mag.Sc., Dr.Phil. (Copenhagen);* Karl Milton Wilbur, *Ph.D. (Pennsylvania).*

**Visiting Professor**

Sally Hughes-Schrader, *Ph.D. (Columbia).*

**Associate Professors**

Joseph Randle Bailey, *Ph.D. (Michigan);* Donald J. Fluke, *Ph.D. (Yale);* Wanda Sanborn Hunter, *Ph.D. (U.C.L.A.);* Peter H. Klopfer, *Ph.D. (Yale);* Daniel A. Livingstone, *Ph.D. (Yale), Director of Graduate Studies;* Henry Stoutte Roberts, Jr., *Ph.D. (Duke);* F. John Vernberg, *Ph.D. (Purdue);* Calvin L. Ward, *Ph.D. (Texas).*

**Associate Research Professor**

Bodil Schmidt-Nielsen, *D.D.S., Dr.Odont., Dr.Phil (Copenhagen).*

**Assistant Professor**

John DeForest Costlow, Jr., *Ph.D. (Duke).*

**Courses of Instruction**

201. Animal Behavior (Not 1964-65)
203. Ecology
210. Experimental Genetics (1964-65)
214. Biological Oceanography
216. Limnology (1964-65)
222. Entomology*
224. Vertebrate Zoology (Not 1964-65)
228. Experimental Embryology (Not 1964-65)
238. Systematic Zoology (1964-65)
245. Radiation Biology (Not 1964-65)
246. Molecular Biology (1964-65)
247. Biological Nucleonics (Not 1964-65)
252. Comparative Physiology
253. Advanced Vertebrate Morphology*
271. Cellular Physiology
274. Invertebrate Zoology*
276. Protozoology*
278. Invertebrate Embryology*
351, 352. Departmental Seminar
353, 354. Research
355, 356. Seminar

**Marine Laboratory**

203. Marine Ecology
214. Biological Oceanography
250. Physiological Ecology of Marine Animals
274. Marine Invertebrate Zoology

## Medical School

The facilities of the several Departments of the Medical School listed below and alphabetically as departments are available to qualified graduate students, already admitted to the Graduate School, for independent or supervised research and investigation, whether or not they are working toward advanced degrees.

Graduate students wishing to pursue a major or minor in any of the following departments, or to enroll in any of the courses listed elsewhere, should consult or write the appropriate Director of Graduate Studies.

Because of the special schedules maintained in the Medical School, graduate

students should write the Directors to ascertain the precise dates when courses are offered.

Anatomy (see p. 36)
Biochemistry and Nutrition (see p. 37)
Hospital Administration (see p. 47)
Microbiology (including Mycology, Parasitology, and Hematology) (see p. 49)
Physiology and Pharmacology (see p. 51)

## Master's Degree for Students Specializing in Physical Therapy

Students specializing in physical therapy may request admission to the Graduate School and if admitted follow the curriculum for the Master of Arts degree of either the Anatomy or Physiology Department. Selected physical therapy subjects are integrated with the graduate courses the first year. A thesis and the remaining physical therapy courses and practicum may be completed the second year. Upon satisfactory completion of these requirements a Master of Arts degree and a Certificate in Physical Therapy will be awarded. For information concerning the Physical Therapy Program write Miss Helen Kaiser, Director, Physical Therapy Department, Box 3247, Duke University Medical Center.

Include here a statement of your special interests and plans, your purposes and objectives in undertaking graduate study, your experience in foreign travel. If you have attended more than the usual number of preparatory institutions, give reasons for your change. If you have communicated with a Department or any member of the faculty about your graduate study, please name the Department or person.

.....  .....

*Date*  *Signature*

**Not to Be Filled in by Applicant**

Graduate School Comments:

Department Recommendation:

Action:

# DUKE UNIVERSITY

THE GRADUATE SCHOOL OF ARTS AND SCIENCES

DURHAM, NORTH CAROLINA

***Application for Graduate School***
***Admission and Award***

I WISH TO APPLY FOR:
ADMISSION AND AWARD.....

IF AN AWARD IS NOT POSSIBLE I WISH
CONSIDERATION FOR ADMISSION ONLY.....

---

1. Full name (print).....
*Last (Mr., Miss, or Mrs.) First Middle*

2. Home address.....

3. Present mailing address (until.....).....
*Date Street and No. City State*

4. Date of birth.....Birthplace.....
*City State Country*

5. Citizenship: ☐ United States ☐ Other Type of Visa.....

6. Single.....; Married.....; Divorced.....; Separated.....

7. Full name of wife (husband).....No. of Children.....

8. (a) For what academic year do you wish an appointment? 19.....-19.....
(b) For what term do you desire admission? Fall.....; Spring.....; Summer I....., Summer II.....
*(c) Indicate by use of the numerals 1, 2, 3 your preference for appointment:*
Fellowship..... Scholarship..... Assistantship.....

9. Proposed major department.....Special field.....

10. What degree do you seek? A.M..... M.S..... M.Ed..... M.A.T..... M.H.A..... Ed.D..... Ph.D..... None.....

11. List in chronological order all colleges and universities attended. Transcripts from each school must be sent to the Office of the Dean of the Graduate School directly from the institution.

| *Institution* | *Location* | *Dates of Attendance From* | *To* | *Degree Granted or Expected (with date)* |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

12. Have you ever been dismissed from a school or placed on probation?..... If so give details. (Use separate sheet of paper if necessary.).....

13. To what other Graduate Schools are you applying?.....

NAME..... *Last First Middle*
DEPT.....
Spec.....
(For GRADUATE SCHOOL Use Only)
TRANSCRIPTS
REQUESTS: DOCS. RECOM. GRE MAT ENVELOPES

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C., 27706.

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N. C., 27706.

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# BULLETIN

OF

# DUKE UNIVERSITY




## DIRECTORY
## OF THE
## OFFICERS, FACULTY, AND STAFF

DURHAM, NORTH CAROLINA
1964

# Officers of the University for the Year 1963-64

## *The Corporation*

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(The date in parentheses indicates the year of election.)

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## *Emeriti*

| | |
|---|---|
| Thomas Malcolm Aycock<br>*Professor Emeritus of Physical Education* | D-2-D University Apartments |
| Paull Franklin Baum, Ph.D.<br>*James B. Duke Professor Emeritus of English* | 112 Pinecrest Road |
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| Harold Crusius Bird, Ph.B., C.E.<br>*Professor Emeritus of Civil Engineering* | 1209 Virginia Avenue |
| Hugo Leander Blomquist, Ph.D.<br>*Professor Emeritus of Botany* | 922 Demerius Street |
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| Alfred Smith Brower, A.B.<br>*Business Manager and Treasurer Emeritus* | 2543 Sevier Street |
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| Wilburt Cornell Davison, M.D., D.Sc., LL.D.<br>*James B. Duke Professor Emeritus of Pediatrics and*<br>*Dean Emeritus of the School of Medicine* | Norwich Way, Hope Valley |
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| Allan H. Gilbert, Ph.D.<br>*Professor Emeritus of English* | 503 Compton Place |
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| George T. Hargitt, Ph.D., Sc.D.<br>*Professor Emeritus of Zoology* | 811 Watts Street |

†Died, March 28, 1963

| | |
|---|---|
| Hornell Norris Hart, Ph.D.<br>*Professor Emeritus of Sociology* | Florida Southern College<br>Lakeland, Fla. |
| Charles Cleveland Hatley, Ph.D.<br>*Professor Emeritus of Physics* | Mt. Pleasant, N. C. |
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| Leslie Benjamin Hohman, M.D.<br>*Professor Emeritus of Psychiatry* | 1520 Hermitage Court |
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| William Henry Irving, B.A. (Oxon.), Ph.D.<br>*Professor Emeritus of English* | 2707 Legion Avenue |
| Howard Eikenberry Jensen, Ph.D.<br>*Professor Emeritus of Sociology* | 143 Pinecrest Road |
| Brady Rimbey Jordan, Ph.D.<br>*Professor Emeritus of Romance Languages* | 117 Pinecrest Road |
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| Malcolm McDermott, LL.B.<br>*Professor Emeritus of Law* | 1316 Orange Avenue<br>McAllen, Texas |
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| Clement Vollmer, Ph.D.<br>*Professor Emeritus of German* | 1617 Pinecrest Road |

†Died October 28, 1963

| | |
|---|---|
| Herbert von Beckerath, Ph.D.<br>*Professor Emeritus of Political Science and Economics* | Morgan Creek Road<br>Chapel Hill, N. C. |
| Warren Chase Vosburgh, Ph.D.<br>*Professor Emeritus of Chemistry* | 2319 Englewood Avenue |
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| Loring Baker Walton<br>*Professor Emeritus of Romance Languages* | 2235 Cranford Road |
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| Ralph Sydney Wilbur, B.S. in M.E., M.E.<br>*Professor Emeritus of Mechanical Engineering* | 1018 Demerius Street |
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| Frederick Adolphus Wolf, Ph.D.<br>*James B. Duke Professor Emeritus of Botany* | 924 Urban Avenue |

## *General Administration*

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| Robert Taylor Cole, Ph.D.<br>*Provost* | 7 Sylvan Road |
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| Barnes Woodhall, M.D.<br>*Vice Provost* | 4006 Dover Road<br>Hope Valley |
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| Richard Lovejoy Tuthill, Ed.D.<br>*University Registrar* | 2709 Dogwood Road |
| Craufurd David Goodwin, Ph.D.<br>*Secretary* | 2256 Cranford Road |
| Edwin Constant Bryson, LL.B.<br>*University Counsel* | 818 Anderson Street |

# *Instructional Staff*

John B. Abernethy (1963)
*Assistant Instructor in Physical Education* — 904 Lancaster Street

Frances Dorothy Acomb (1945), Ph.D. (Chicago)
*Associate Professor of History* — H-2B University Apartments

Donald Keith Adams (1931), Ph.D. (Yale)
*Professor of Psychology* — 1214 Cornwallis Road

Julia Agner (1958), B.S.N. (Duke)
*Instructor in Nursing* — 3720 Kenmore Road

John Richard Alden (1955), Ph.D. (Michigan)
*James B. Duke Professor of History* — 2736 Dogwood Road

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*Associate in Radiology* — Alastair Court Apartments

Irving E. Alexander (1963), Ph.D. (Princeton)
*Professor of Medical Psychology in Department of Psychiatry and Professor of Psychology* — 1111 Watts Street

Eleanor Janet Allen (1963), M.S.S. (Smith)
*Associate in Psychiatric Social Work* — 301 West Trinity Avenue

Arthur Tilo Alt (1961), M.A. (Texas)
*Instructor in German* — 804 Ellerbee Street

John Cooley Altrocchi (1957), Ph.D. (California)
*Assistant Professor of Psychology and Associate Professor of Medical Psychology in Department of Psychiatry* — 1702 Forest Road

Edwin Pascal Alyea (1930), M.D. (Johns Hopkins)
*Professor of Urology* — 3102 Devon Road, Hope Valley

Dennis Bernard Amos (1962), M.B. (Guy's Hospital Medical School, London)
*Professor of Immunology and Associate Professor of Experimental Surgery* — Rt. #3, Hillsboro

Carl L. Anderson (1955), Ph.D. (Pennsylvania)
*Assistant Professor of English* — 2400 Chapel Hill Road

Hugh Anderson (1957), B.D., Ph.D. (Glasgow)
*Professor of Biblical Criticism and Theology* — 917 Green Street

Lewis Edward Anderson (1936), Ph.D. (Pennsylvania)
*Professor of Botany* — 2020 Sunset Avenue

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*Professor of Forest Entomology* — 2528 Perkins Road

William Banks Anderson (1930), M.D. (Johns Hopkins)
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W. Banks Anderson, Jr. (1962), M.D. (Harvard)
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William Robert Anderson (1963), M.D. (Pennsylvania)
*Associate in Pathology* — Airport Road, Chapel Hill

William G. Anlyan (1952), M.D. (Yale)
*Professor of Surgery* — 1124 Woodburn Road

Jay Morris Arena (1933), M.D. (Duke)
*Professor of Pediatrics* — 1403 Woodburn Road

Kiro Pete Arges (1953), M.S. in C.E. (Tennessee)
*Assistant Professor of Civil Engineering* — 802 W. Maynard Street

John Leslie Artley (1955), D.Eng. (Johns Hopkins)
*Associate Professor of Electrical Engineering* — 2417 Wrightwood Avenue

Hans W. Baade (1960), LL.M. (Duke)
*Associate Professor of Law* — 2512 N. Duke Street

Kurt W. Back (1959), Ph.D. (M.I.T.)
*Associate Professor of Medical Sociology in Department of Psychiatry and Professor of Sociology in Department of Sociology* — 2735 McDowell Street

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Robert George Ghirardelli (1962), (California Institute of Technology)
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Richard A. Gillespie (1963), M.D. (Tennessee)
*Associate in Anesthesiology* Ephesus Church Road

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Donald E. Ginter (1963), Ph.D. (California)
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Sherwood Githens, Jr. (1962), Ph.D. (North Carolina)
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*Associate in Orthopedics* 615 Swift Avenue

James F. Glenn (1963), M.D. (Duke)
*Professor of Urology* 27 Oak Drive

Robert Dean Goben (1963), B.S. (Illinois)
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Clarence Gohdes (1930), Ph.D. (Columbia)
*James B. Duke Professor of English* 2737 Circle Drive

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Robert Goodhand (1961), Ph.D. (Rice)
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Craufurd D. Goodwin (1962), Ph.D. (Duke)
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*James B. Duke Professor of Physics* 2521 Perkins Road

John A. Goree (1959), M.D. (Duke)
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Ralph J. Gorten (1963), M.D. (Pennsylvania)
*Associate in Medicine*

Virginia Gover (1960), R.N., M.S.N. (Boston College)
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Richard Babson Grant (1952), Ph.D. (Harvard)
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Ronald C. Greene (1958), Ph.D. (California Institute of Technology)
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*Professor of Zoology* 3702 Randolph Road

Robert A. Gregg (1961), M.D. (South Carolina)
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Eugene Greuling (1948), Ph.D. (Indiana)
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Egil Grislis (1959), B.D., Ph.D., (Yale)
*Assistant Professor of Historical Theology* — 2323 Englewood Avenue

Paul Magnus Gross (1919), Ph.D. (Columbia)
*William Howell Pegram Professor of Chemistry* — 3816 Dover Rd., Hope Valley

Samson R. Gross (1960), Ph.D. (Columbia)
*Associate Professor of Microbiology* — 2411 Prince Street

Julia Rebecca Grout (1924), M.S. (Wellesley)
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Walter R. Guild (1960), Ph.D. (Yale)
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J. Caulie Gunnells (1962), M.D. (South Carolina)
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Norman Guttman (1951), Ph.D. (Indiana)
*Professor of Psychology* — 201 Woodridge Drive

Donald B. Hackel (1960), M.D. (Harvard)
*Professor of Pathology* — 2535 Perkins Road

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Kenneth D. Hall (1958), M.D. (Duke)
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Louise Hall (1931), S.B. Arch., Ph.D. (Radcliffe)
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William Baskerville Hamilton (1936), Ph.D. (Duke)
*Professor of History* — 300 Swift Avenue, Alastair Court Apartments

Philip Handler (1939), Ph.D. (Illinois)
*James B. Duke Professor of Biochemistry and Nutrition* — 2529 Perkins Road

John Kennedy Hanks (1954), M.A. (Columbia)
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Charles M. Harman (1961), Ph.D. (Wisconsin)
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Ellwood Scott Harrar (1936), Ph.D. (Syracuse) Sc.D.
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Francis Parks Harrison (1947), Ph.D. (Michigan State)
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Julian Deryl Hart (1930), M.D. (Johns Hopkins)
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William John Harvey (1961), B.S. (Appalachian)
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George Corbin Harwell (1935), Ph.D. (Duke)
*Associate Professor of English* — 2115 Wilson Street

Charles Roy Hauser (1929), Ph.D. (Iowa)
*James B. Duke Professor of Chemistry* — 1020 Rosehill Avenue

Peter L. Hein (1963), M.D. (Georgetown)
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James Paisley Hendrix (1938), M.D. (Pennsylvania)
*Associate Professor of Medicine and Therapeutics* — 144 Pinecrest Road

Mrs. Mildred L. Hendrix (1958), B.S. (North Carolina)
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James Donald Henry (1960), M.M. (Indiana)
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Stuart C. Henry (1959), B.D., Ph.D. (Duke)
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Raphael R. Hernandez (1962), M.D. (Duke)
*Associate in Medicine* — Ashley Road

Stephen Duncan Heron, Jr. (1950), Ph.D. (North Carolina)
*Associate Professor of Geology* — 1404 Anderson Street

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Albert Heyman (1953), M.D. (Maryland)
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Frederick R. Hine (1958), M.D. (Yale)
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Marie Hinman (1959), M.S. (Florida State)
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Lowell A. Hinrichs (1962), Ph.D. (Oregon)
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Marcus Edwin Hobbs (1935), Ph.D. (Duke)
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Paul E. Hockstein (1963), Ph.D. (Maryland)
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Irving Brinton Holley, Jr. (1947), Ph.D. (Yale)
*Professor of History* — 2506 Wrightwood Avenue

William Hollister (1956), M.D. (Duke)
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*Professor of Education* — 2016 Campus Drive

Calvin Bryce Hoover (1925), Ph.D. (Wisconsin), Litt.D.
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Paul Horowicz (1961), Ph.D. (Johns Hopkins)
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J. Woodford Howard, Jr. (1962), Ph.D. (Princeton)
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Sally Hughes-Schrader (1962), Ph.D. (Columbia)
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Wayland Elroy Hull (1953), Ph.D. (Duke)
*Associate Professor of Physiology* — 1624 Marion Avenue

Harold J. Humm (1954), Ph.D. (Duke)
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Mrs. Wanda Sanborn Hunter (1947), Ph.D. (California)
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*Professor of Education* — 112 Buchanan Boulevard

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O. Kelly Ingram (1959), B.D. (Duke)
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Ann Madeline Jacobansky (1953), R.N., M.Ed. (Pittsburgh)
*Professor of Nursing* — 102 Faculty Apartments

Agnes Jane Janoscrat (1963)
*Instructor in Nursing* — 15 Campus Apartments

Marianna Duncan Jenkins (1948), Ph.D. (Bryn Mawr)
*Associate Professor of Art* — 619 Morehead Avenue

Malcolm E. Jewell (1963), Ph.D. (Pennsylvania)
*Visiting Associate Professor of Political Science* — 1106 West Knox

Bronislas de Leval Jezierski (1958), Ph.D. (Harvard)
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Frederick Charles Joerg (1947), M.B.A. (Harvard)
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Charles B. Johnson (1956), Ed.D. (Duke)
*Associate Professor of Education* — 2714 McDowell Street

Edward Anthony Johnson (1963), B.S. (Sheffield)
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Terry Walter Johnson, Jr. (1954), Ph.D. (Michigan)
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John Devereaux Johnston (1962), LL.B. (Duke)
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William Webb Johnston (1963), M.D. (Duke)
*Associate in Pathology* — 1025 Monmouth Avenue

Barney L. Jones (1956), B.D., Ph.D. (Duke)
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Buford Jones (1962), Ph.D. (Harvard)
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Edward Ellsworth Jones (1953), Ph.D. (Harvard)
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James David Jones (1963), M.D. (Duke)
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Leon Lloyd Jones (1963), Ph.D. (Utah)
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Thomas T. Jones (1958), M.D. (Johns Hopkins)
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Helen Louise Kaiser (1943), R.P.T. (Harvard)
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William Arthur Kale (1952), B.D. (Duke), D.D.
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Robert Norman Kearney (1963), Ph.D. (California)
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Walter Kempner (1934), M.D. (Heidelberg)
*Professor of Medicine* — 1505 Virginia Avenue

Van Leslie Kenyon, Jr. (1945), M.M.E. (Virginia)
*Professor of Mechanical Engineering* — Route 2, Hillsboro, N. C.

Grace Pardridge Kerby (1947), M.D. (Duke)
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Alan C. Kerckhoff (1958), Ph.D. (Wisconsin)
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Kaye H. Kilburn (1962), M.D. (Utah)
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Thomas DeArman Kinney (1960), M.D. (Duke)
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Joseph Weston Kitchen, Jr. (1962), Ph.D. (Harvard)
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Robert Frederick Klein (1963), M.D. (Alabama)
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William Klenz (1947), Ph.D. (North Carolina)
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Peter H. Klopfer (1958), Ph.D. (Yale)
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Kenneth Richard Knoerr (1961), Ph.D. (Yale)
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Wellington W. Koepsel (1963), Ph.D. (Oklahoma State)
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John C. Kouns (1957), D.D.S. (Emory)
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Paul Jackson Kramer (1931), Ph.D. (Ohio State)
*James B. Duke Professor of Botany* — 2251 Cranford Road

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Mrs. Juanita Kreps (1955), Ph.D. (Duke)
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William R. Krigbaum (1952), Ph.D. (Illinois)
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Sudhir Kuman (1959), Ph.D. (Pennsylvania)
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Stanley M. Kurtz (1961), M.D., Ph.D. (George Washington)
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Mrs. Maurine Boie LaBarre (1961), M.S.W. (Bryn Mawr)
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Weston LaBarre (1946), Ph.D. (Yale)
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Creighton Lacy (1953), B.D., Ph.D. (Yale)
*Associate Professor of World Christianity* — 2714 Dogwood Road

Martin Lakin (1958), Ph.D. (Chicago)
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Charles Earl Landon (1926), Ph.D. (Illinois)
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Thomas A. Langford (1956), B.D., Ph.D. (Duke)
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John Tate Lanning (1927), Ph.D. (California)
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Arthur Larson (1958), D.C.L. (Oxon.)
*Professor of Law* — 3408 Dover Rd., Hope Valley

John Laszlo (1960), M.D. (Harvard)
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Maurice Lesage (1959), M.D. (Paris) Route #2
*Assistant Professor of Experimental Surgery* Chapel Hill, N. C.

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*Associate Professor of Physiology and Pharmacology and*
*Associate in Pediatrics* Box 204B, Route #1, Erwin Road

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*Professor of Psychiatry and Assistant*
*Professor of Pediatrics* Route 3, Box 309, Old Apex Road

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Angus M. McBryde (1931), M.D. (Pennsylvania)
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Kenneth Scott McCarty (1959), Ph.D. (Columbia)
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Thomas E. McCollough (1961), Th.D.
*Assistant Professor of Religion* — 2227 Cranford Road

Donald E. McCollum (1962), M.D. (Bowman Gray)
*Assistant Professor of Orthopedic Surgery* — 1012 N. Duke Street

Alice L. McCrea (1961), M.S. (Chicago)
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Gelolo McHugh (1946), Ph.D. (Columbia)
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Henry McIntosh (1955), M.D. (Pennsylvania)
*Professor of Medicine* — 2705 Stuart Drive

James Thomas McKeel, Jr. (1956), M.S. (North Carolina State)
*Assistant Professor of Electrical Engineering* — 2622 Charlotte Street

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Thomas Joseph McManus (1961), M.D. (Boston)
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Harry Thurman McPherson (1955), M.D. (Duke)
*Associate Professor of Medicine* — 3200 Oxford Drive

Samuel D. McPherson, Jr. (1949), M.D. (Johns Hopkins)
*Associate in Ophthalmology* — 29 Oak Drive

John Nelson Macduff (1956), M.M.E. (New York)
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George L. Maddox (1960), Ph.D. (Michigan State)
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Alan Krebs Manchester (1929), Ph.D. (Duke)
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Joseph Eldridge Markee (1943), Ph.D. (Chicago)
*James B. Duke Professor of Anatomy* — 1015 Demerius Street

Sidney David Markman (1947), Ph.D. (Columbia)
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Lynn La Due Marshall (1961), Ph.D. (California)
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*Assistant Professor of Religion and Lecturer in Old Testament* 206 Faculty Apartments

John D. Sullivan (1958), Ph.D. (Michigan State)
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Elizabeth Read Sunderland (1939-42; 1943), Ph.D. (Radcliffe)
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Robert Oscar Swan (1961), A.M.L.S. (Pennsylvania)
*Lecturer and Bibliographer in Department of Russian and Library* — 803 Buchanan Boulevard

Louis Earl Swanson (1949), A.B. (Hamline)
*Associate Professor of Hospital Administration* — 2418 Wrightwood Avenue

Charles Tanford (1960), Ph.D. (Princeton)
*Professor of Physical Biochemistry* — 1101 Norwood Avenue

Frank R. Tangherlini (1961), Ph.D. (Stanford)
*Assistant Professor of Physics* — 2306 Indian Trail

Dorothy Ellen Tate (1962), M.S. (Pennsylvania State)
*Assistant Professor of Dietetics* — 423 Whitehead Court, Chapel Hill, N. C.

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*Assistant Professor of Surgery* — V. A. Staff Quarters

Marcel Tétel (1960), Ph.D. (Wisconsin)
*Assistant Professor of Romance Languages* — 2214 Prince Street

Ralph Edward Thiers (1960), Ph.D. (Toronto)
*Associate Professor of Biochemistry* — 2407 W. Club Boulevard

Joseph Miller Thomas (1930), Ph.D. (Pennsylvania)
*Professor of Mathematics* — 2215 Cranford Road

Walter Lee Thomas, Jr. (1932-35; 1937-42; 1945), M.D. (Virginia)
*Professor of Obstetrics and Gynecology* — 1200 Leon Street

Edgar Tristram Thompson (1935), Ph.D. (Chicago)
*Professor of Sociology* — 138 Pinecrest Road

Howard K. Thompson (1962), M.D. (Columbia)
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Larry W. Thompson (1961), Ph.D. (Florida State)
*Assistant Professor of Medical Psychology in Department of Psychiatry and Lecturer in Psychology* — 1614 Alcott Street

David Ronald Tilley (1961), Ph.D. (Johns Hopkins)
*Assistant Professor of Physics* — 1402 Green Street

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*Assistant Professor of Neurosurgery* — 1411 North Gregson Street

Bert Titus (1961)
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Russell F. Tomlinson (1959), Ph.D. (Florida)
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E. Clifford Toren, Jr. (1961), Ph.D. (Illinois)
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Elias Torre (1951), Doctor en Filosofía y Letras (Madrid)
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Robert Richard Trevarthen (1963), M.M. (Michigan)
*Visiting Lecturer in Music* — 107 Channing Avenue

Martha Trotter (1962), B.S. (E. Tennessee State)
*Associate in Physical Therapy* — 106 Buchanan Boulevard

James Nardin Truesdale (1930), Ph.D. (Duke)
*Professor of Greek* — 105 Pinecrest Road

Arlin Turner (1953), Ph.D. (Texas)
*Professor of English* — 1115 Woodburn Road

Mrs. Violet Horner Turner (1943), M.D. (Chicago)
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Richard Lovejoy Tuthill (1953), Ed.D. (Columbia)
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David M. Twomey (1962), M.A. (Maryland), Major U.S.M.C.
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Malcolm P. Tyor (1955), M.D. (Duke)
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Luella Jane Uhrhane (1947), R.N., M.P.H. (North Carolina)
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Charles Rowe Vail (1939), Ph.D. (Michigan)
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Jacinto J. Vazquez (1963), M.D. (Havana)
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Mrs. Martha Delia Vazquez (1963), M.D. (Havana)
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Adriaan Verwoerdt (1962), M.D. (Amsterdam)
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Andrew Grover Wallace (1963), M.D. (Duke)
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Charles Eugene Ward (1927), Ph.D. (Duke)
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*William H. Wannamaker Professor of Romance Languages* — 3443 Rugby Road

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Richard L. Wells (1962), Ph.D. (Indiana)
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Paul Welsh (1948), Ph.D. (Cornell)
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William Robert Wentz (1963), M.S. (North Carolina)
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Martha L. Wertz (1960), M.S.W. (Tulane)
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Amos Leslie Willson (1961), Ph.D. (Yale)
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*Assistant Professor of Air Science* — 1904 Dacian Avenue

Neil L. Wilson (1957), Ph.D. (Yale)
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Robert Renbert Wilson (1925), Ph.D. (Harvard), LL.D.
*James B. Duke Professor of Political Science* — 717 Anderson Street

Ruby Wilson (1959), M.S.N. (Western Reserve)
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Thomas G. Wilson (1959), Sc.D. (Harvard)
*Professor of Electrical Engineering* — 2721 Sevier Street

William P. Wilson (1961), M.D. (Duke)
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*Instructor in Physics* — 319-½ East Trinity

Halliman H. Winsborough (1962), Ph.D. (Chicago)
*Assistant Professor of Sociology* — 2717 Augusta Drive

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Loren Ralph Withers (1949), M.S. (Juilliard)
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Benjamin Wittels (1961), M.D. (Minnesota)
*Assistant Professor of Pathology* — 1300 Carolina Avenue

C. Hilburn Womble (1958), Ph.D. (Johns Hopkins)
*Assistant Professor of Latin* — 1309 Alabama Avenue

Donald J. Wood (1962), Ph.D. (Carnegie Institute of Technology)
*Assistant Professor of Civil Engineering* — Rt. 2, Chapel Hill, N. C.

Barnes Woodhall (1937-43; 1945), M.D. (Johns Hopkins)
*Professor of Neurosurgery* — 4006 Dover Road, Hope Valley

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Alma Lorraine Woodyard (1954), M.Ed. (North Carolina, Greensboro)
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Allan D. Wooley (1962), Ph.D. (Princeton)
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Boyd T. Worde (1958), M.D. (Tennessee)
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Mrs. Julia Ann Hedgepeth Wray (1955), M.F.A. (North Carolina, Greensboro)
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James B. Wyngaarden (1956), M.D. (Michigan)
*Professor of Medicine and Associate Professor of Biochemistry* — 1106 West Knox Street

James O. Wynn (1959), M.D. (Cornell)
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*Associate Professor of Economics* — 2021 Dartmouth Drive

James G. Yoho (1956), Ph.D. (Michigan State)
*Professor of Forest Economics* — 2522 Sevier Street

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Paul Young (1956), M.A. (Illinois)
*Professor in the Faculty of Arts and Sciences* — 1110 Shepherd Street

W. Glenn Young (1954), M.D. (Duke)
*Professor of Surgery* — 1407 Dollar Avenue

Karl Edward Zener (1928), Ph.D. (Harvard)
*Professor of Psychology* — 2727 Sparger Road

Chester M. Zmijewski (1963), Ph.D. (Buffalo)
*Assistant Professor of Immunology* — 3609 Westover Road

## *Part-Time Instructors*

Jonathan Edwards Adams, Jr., B.S.
*Mathematics* — 259 Men's Graduate Center

Robert Brown Ambrose, B.S.
*Mathematics* — 204 Men's Graduate Center

James Lee Babin, B.A.
*Graduate Tutor in English* — 2005 Yearby Street

Paul J. Baker, M.A.
*Sociology* — 2114 Elba Street

John W. Battle, A.B.
*Romance Languages* — Methodist Student Center

James R. Belflower, M.A.
*Graduate Tutor in English* — Box 4425, Duke Station

Paul Robert Bengel, B.S.
*Mechanical Engineering* — 3325-B Glasson Street

James Voigt Bewich, M.B.A.
*Mathematics* — 1506 Kent Street

Louis Bowles Bresee, B.S.
*Mechanical Engineering* — 1305 East Leon Street

Anne-Marie Bryan, M.A.T.
*Romance Languages* — 2400 Tampa Avenue

Richard W. Burow, B.S.
*Mechanical Engineering* — 813 Green Street

Douglas Moore Cairns, B.S.
*Mathematics* — 1200 Leon Street H-8

George A. Cate, M.A.
*Graduate Tutor in English* — Box 5672, Duke Station

A. Ralph Cavaliere, M.S.
*Botany* — 1208 Arnette Avenue

| | |
|---|---|
| William F. Chambers, M.S.<br>*Electrical Engineering* | D-3C University Apartments |
| Chang Chen, B.S.<br>*Civil Engineering* | 1269 Men's Graduate Center |
| Eddie Gay Cone, M.A.<br>*Graduate Tutor in English* | 1104 Men's Graduate Center |
| Larry Wayne Cook, M.A.<br>*Graduate Tutor in English* | Box 5855, Duke Station |
| Ronald Crossley, B.D.<br>*Religion* | Route 1<br>Hillsboro, N. C. |
| James K. Day, A.B.<br>*German* | 215 Vance Street<br>Chapel Hill, N. C. |
| John J. Dunn, M.A.<br>*Graduate Tutor in English* | 3311-A Glasson Street |
| Frank E. Eakin, B.D.<br>*Religion* | 704 West Club Boulevard |
| Richard R. Entwhistle, M.S.<br>*Mathematics* | 3419-E Glasson Street |
| Lewis Turner Farmer, B.S.<br>*Mathematics* | 1501 Carolina Street |
| John Alden Farrell, B.A.<br>*Physics* | 2213 Elder #9 |
| Richard F. Glenn, B.A.<br>*Romance Languages* | 1197 Men's Graduate Center |
| William O. Goode, M.A.<br>*Romance Languages* | 1187 Men's Graduate Center |
| Thomas Frederick Gordon<br>*Mathematics* | 2715 Augusta Drive |
| Elizabeth W. Grant, M.A.<br>*Romance Languages* | 2509 Wrightwood |
| David G. Hale, M.A.<br>*Graduate Tutor in English* | 309 West Geer Street |
| James Edward Hall, B.S.E.E.<br>*Electrical Engineering* | 1221 Men's Graduate Center |
| Mary Griffin Halloran, M.A.<br>*Graduate Tutor in English* | 701 Louise Circle |
| Edward William Hammond, B.S.E.E.<br>*Electrical Engineering* | 17 Forrestdale Drive |
| Wayne Earle Haskin, M.A.<br>*Graduate Tutor in English* | 1706 Lake Street |
| Karin Barbara Henke, B.A.<br>*German* | 106 Epworth Inn |
| Robert A. Hohner, M.A.<br>*History* | 838 Louise Circle |
| Anne Thistlewaite Hull, M.A.<br>*Romance Languages* | 928 Lambeth Circle |
| Joseph Marvin Hunt, III, M.S.E.E.<br>*Electrical Engineering* | Apartment B-2<br>1403 Duke University Road |
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| Richard M. Kelly, M.A.<br>*Graduate Tutor in English* | 305 West Maynard Avenue |
| William Daniel Kelly, B. S.<br>*Mathematics* | 2716 Circle Drive |

| | |
|---|---|
| William T. Kendrick, B.A.<br>*Mechanical Engineering* | Men's Graduate Center |
| James M. Kuist, M.A.<br>*Graduate Tutor in English* | 503 Compton Place |
| Granvil C. Kyker, Sc.B.<br>*Physics* | 807 Demerius St. J-4 |
| John T. LaVia, M.A.<br>*Graduate Tutor in English* | 3324-A Glasson Street |
| Jean Pierre Le Floch, Ind. Dipl.<br>*Electrical Engineering* | 3406-H Mordecai Street |
| Norman Locksley, M.A.<br>*Mathematics* | 611 West Markham Avenue |
| Johan A. Lovink, M.A.<br>*Political Science* | 3440-C Glasson Street |
| Ernest Asbury Lumsden, Jr., B.A.<br>*Psychology* | 708 Parker Street |
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| Jon M. Moline, A.B.<br>*Philosophy* | 1301 Clarendon Street |
| Charles A. Moore, Jr., B.S.<br>*Civil Engineering* | Route 3, Box 310 |
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| Erskine Dixon Owens, A.B.<br>*Physical Education* | 2207-A Elder Street |
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| Denny E. Pilant, M.A.<br>*Political Science* | 903 Lambeth Circle |
| Don C. Piper, Ph.D.<br>*Political Science* | 2511 Banner Street |
| Charles T. Pridgeon, M.A.<br>*Graduate Tutor in English* | 2406 Pratt Avenue #6 |
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| Lamar Cecil Ratcliffe, B.S.<br>*Mathematics* | 1804 Bivins Street |
| David Charles Roller, M.A.<br>*History* | 9216, Duke Station |
| Surendra Kumar Saxena, B.S.E.E.<br>*Civil Engineering* | 3660 Guess Road |
| Russell P. Sparling, M.A.<br>*Graduate Tutor in English* | 1309 Washington Street |
| W. K. Stars, M.A.<br>*Art* | 1916 Glendale Avenue |

| | |
|---|---|
| Glen Stassen, B.D.<br>*Religion* | 3325-C Glasson Street |
| Max Keith Sutton, M.A.<br>*Graduate Tutor in English* | 3306 Hope Valley Road |
| Robert M. Terry, B.A.<br>*Romance Languages* | 1169 Men's Graduate Center |
| George Joseph Titus, B.M.E.<br>*Mechanical Engineering* | 134 Men's Graduate Center |
| Adolph Edward Tokaz, B.S.<br>*Mathematics* | 1106 Burch Avenue |
| Robert Amrine Turner, B.S.<br>*Mathematics* | 308 Men's Graduate Center |
| Ralph M. Tutt, Jr., M.A.<br>*Graduate Tutor in English* | 208 Buchanan Boulevard |
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| Edward Joseph Wiltrakis, B. S.<br>*Mathematics* | 2117 Englewood Avenue |
| Yuan Yu, B.S.<br>*Electrical Engineering* | 3308-F Glasson Street |

## *Research Associates*

| | |
|---|---|
| Seymour Axelrod, Ph.D.<br>*Psychiatry* | 805 West Club Boulevard |
| Robert W. Blount, Ph.D.<br>*Physiology* | Johnston House<br>Route 3, Hillsboro, N. C. |
| Yozo Chatani, Ph.D.<br>*Chemistry* | 1201 Alabama Avenue |
| Robert Lee Cook, Ph.D.<br>*Physics* | Westover Park Apartments |
| Chicita F. Culberson, Ph.D.<br>*Botany* | Route 1, King Road |
| Eubert Jonathan Daniel, Ph.D.<br>*Pathology* | 1620 Alcott Street |
| Terence John Dawson, Ph.D.<br>*Zoology* | 2213 Elder Street |
| Robert E. Doolittle, Ph.D.<br>*Chemistry* | 815 Louise Circle |
| Lloyd Ray Fortney, Ph.D.<br>*Physics* | 1200 Leon Street |
| John Albert Freeman, Ed.D.<br>*Parapsychology* | 1614 University Drive |
| Peter Fritz, Ph.D.<br>*Chemistry* | 1024 West Markham Avenue |
| Ruth Georgiade, M.S.<br>*Surgery* | 2523 Wrightwood Avenue |

| | |
|---|---|
| Joy Rochelle Gold, M.A.<br>*Sociology* | 54 Maxwell Road<br>Chapel Hill, N. C. |
| Kazimierz Gryzybowski, S.J.D.<br>*World Rule of Law Center* | 62 Rosenstatt<br>Leyden, Netherlands |
| John William Halderman, LL.B.<br>*World Rule of Law Center* | 2216 Elmwood Avenue |
| Arthur Brooks Harris, Ph.D.<br>*Physics* | 2208 Chapel Hill Road |
| Ursula Heine, Ph.D.<br>*Surgery* | D-7 1200 Leon Street |
| Clinton Edward Hollandsworth, Jr., Ph.D.<br>*Physics* | 3810 Chapel Hill Road |
| Takeshi Hoshi, Ph.D.<br>*Zoology* | 200 #7 Atlas Street |
| Earl Raymond Hunt, Ph.D.<br>*Physics* | 1030 West Trinity Avenue |
| Donald Cargill Jackson, Ph.D.<br>*Zoology* | 2415 West Club Boulevard |
| Frances Carolina Jeffers, M.A.<br>*Psychiatry* | Route 1, Ephesus Church Road |
| William Jurgelsky, Jr., Ph.D.<br>*Pathology* | 1510 Echo Road |
| Varda F. Kahn, Ph.D.<br>*Physiology* | 1127 Delano Street |
| William G. Kenyon, Ph.D.<br>*Chemistry* | 1500 Duke University Road |
| James Milton Knight, Ph.D.<br>*Physics* | C-3 Westover Park Apartments |
| Nathan Kogan, Ph.D.<br>*Psychology* | 46 Lindon Lane<br>Princeton, New Jersey |
| Jan J. Kohlmeyer, Ph.D.<br>*Botany* | Eichkampotrasse 112<br>Berlin-Grunewald, Germany |
| Hedwig Kohn, Ph.D.<br>*Physics* | 515 South Duke Street |
| Peregrina Labay, M.D.<br>*Surgery* | 922 Lambeth Circle |
| Christoph Landschuetz, Ph.D.<br>*Surgery* | 808 Park Avenue |
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| Shigeo Maruno, Ph.D.<br>*Chemistry* | 1117 Clarendon Street |
| Marion L. Miles, Ph.D.<br>*Chemistry* | 2417 Cascadilla Street |
| Ronald E. Montgomery, Ph.D.<br>*Chemistry* | 911 Burch Street |
| Edward Towson Moore, Ph.D.<br>*Electrical Engineering* | 113 Faculty Apartments |
| Keio Nagami, D.Sc.<br>*Mathematics* | 1010 Lamond Street |
| Shinzo Nakai, Ph.D.<br>*Physics* | 1200 Leon Street |

| | |
|---|---|
| Mahomed Khader Nawaz, M.L.<br>*World Rule of Law Center* | 2304 Elba Street |
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| Winnifred Moon Nielsen, Ph.D.<br>*Parapsychology* | 318 N. Churton Street<br>Hillsboro, N. C. |
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| Koneru Ramakrishna Rao, Ph.D.<br>*Parapsychology* | 2415 Huron Street |
| P. Ramchender Rao, Ph.D.<br>*Surgery* | 1515 Arcadia Street |
| David Cooke Rorer, Ph.D.<br>*Physics* | 3703 Britt Street |
| Theodore Rosett, Ph.D.<br>*Biochemistry* | 1713 James Street |
| Takashi Shinoda, M.D.<br>*Surgery* | 251 Men's Graduate Center |
| Ralph O. Slatyer, D.Sc.<br>*Botany* | CSIRO, Division of Land Research<br>Canberra ACT, Australia |
| Donald W. Slocum, Ph.D.<br>*Chemistry* | 301 Swift Avenue |
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# BULLETIN
## OF
# DUKE UNIVERSITY




## The Summer Session 1964

First Term: June 9 to July 15
Second Term: July 16 to August 21

VOLUME 36 February, 1964 NUMBER 4

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of The College of Engineering, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of The Divinity School, apply to *The Dean of the Divinity School,* Duke University, Durham, N. C.

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For Bulletin of The School of Nursing, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C.

For Bulletin of The Summer Session, apply to *The Director of the Summer Session,* Duke University, Durham, N. C.

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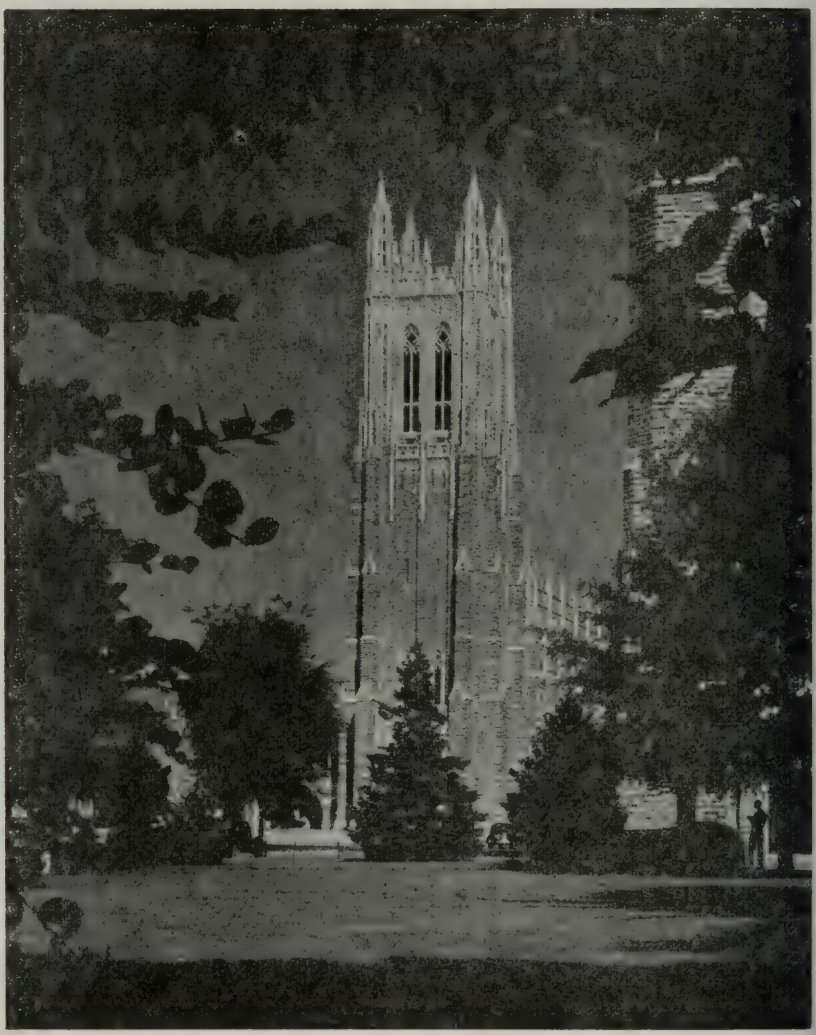
# DUKE UNIVERSITY

## *The Summer Session 1964*

ANNOUNCEMENTS

First Term: June 9 to July 15
Second Term: July 16 to August 21

DURHAM, NORTH CAROLINA
1964



## The Chapel Tower

*The Chapel Tower dominates the scene of West, or the University, Campus, and it symbolizes the spiritual heritage of the University. The predominantly Gothic architecture, traditionally restless and aspiring, contributes to the intellectually stimulating atmosphere of the University and provides an appropriate setting for educational endeavors.*

# Calendar of the Summer Session 1964



| JUNE | | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

| JULY | | | | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

| AUGUST | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

June 7-20, Sunday-Saturday
Basketball Clinic

June 8, Monday
Dormitories ready for occupancy

June 8-12, Monday-Friday
Earth Science Workshop for Elementary Teachers

June 9, Tuesday
Registration for First Term

June 9-July 15, Tuesday-Wednesday
Summer Institute in English

June 9-August 21, Tuesday-Friday
Summer Center on Southern Asia

June 10, Wednesday
Instruction begins in all courses of the First Term, except 4 s.h. science courses

June 11-12, Thursday-Friday
Elementary Education Conference—Health Education and Physical Education

June 15-19, Monday-Friday
Conference on Modern Mathematics for Seventh and Eighth Grade Teachers

June 16, Tuesday
Instruction begins in 4 s.h. courses of First Term in Chemistry, Geology and Physics

June 16-17, Tuesday-Wednesday
School Law Conference

June 20, Saturday
No classes

June 22-August 21, Monday-Friday
National Science Foundation Institute Program

June 24, Wednesday
Final date for filing with the Dean of the Graduate School statement of intention to complete Master's degree requirements during the First Term, and for filing title of Master's thesis.

June 29-July 25, Monday-Saturday
Medical Mycology Course

July 1, Wednesday
French and Spanish examinations for candidates for graduate degrees, 4:00 p.m., room 233, Allen Building. Candidates register in the Graduate School Office not later than June 26.

July 4, Saturday
No classes

July 6-10, Monday-Friday
German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office not later than June 25.

July 7, Tuesday
Major examination for candidates for the M.Ed. degree without thesis

July 8-10, Wednesday-Friday
Piano Teachers' Workshop

July 13-August 7, Monday-Friday
The Methodist Course of Study School

July 13-September 11, Monday-Friday
The Initial Session of the 1964-65 Retired Armed Services Officers Training Program

July 14-15, Tuesday-Wednesday
Final examinations for First Term

July 16, Thursday
Registration for all Second Term courses, including science courses

July 17, Friday
Instruction begins in all Second Term courses, including science courses

July 20-31, Monday-Friday
Clinic in Preaching

July 20-31, Monday-Friday
Clinic in Pastoral Care

July 20-31, Monday-Friday
Rural Church Clinic

July 24, Friday
Final date for filing with the Dean of the Graduate School statement of intention to complete Master's degree requirements during the Second Term, and for filing title of Master's thesis.

July 25, Saturday
No classes

August 8, Saturday
No classes

August 10-14, Monday-Friday
Conference of the Youth Council of the Methodist Youth Fellowship

August 13, Thursday
Major examination for candidates for the M.Ed. degree without thesis

August 14, Friday
Final examination in 4 s.h. courses of the Second Term in Chemistry, Geology and Physics

August 16-22, Sunday-Saturday
Basketball Clinic

August 20-21, Thursday-Friday
Final examinations in all courses of the Second Term, except science courses ending on August 14.

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# Administrative Officers of the Summer Session

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*Treasurer*

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*Institutional Studies and Assistant Provost*

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*The Woman's College*

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*Assistant Dean of Trinity College*

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*Director of the Duke Marine Laboratory*

Mary Grace Wilson, A.M.
*Dean of Undergraduate Women*

---

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*Residence Director and House Counselor for Graduate Women, Term I*

Ella Eugenia Shore, M.A.
*House Counselor for Undergraduate Women, Term I*

Mrs. Mildred D. Durden, M.Ed.
*Residence Director and House Counselor for Graduate Women, Term II*

Joyce Harris, A.B.
*House Counselor for Undergraduate Women, Term II*

W. S. Persons, A.B.
*Recreation Supervisor for the Summer Session*

---

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Howard Charles Wilkinson, D.D.
*Chaplain to the University and Director of Religious Activities*

Paul Young, M.A.
*Director of Choral Music*

# The Summer Session Faculty

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*Instructor in German*

Carl L. Anderson, Ph.D.
*Assistant Professor of English*

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*Assistant Professor of Civil Engineering*

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*University of Illinois*

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*Assistant Professor of Chemistry*

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David Gilbert Bradley, Ph.D.
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*University of North Carolina*

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Louis J. Budd, Ph.D.
*Associate Professor of English*

William S. Bush, Jr., Docteur de l'Universite de Paris
*Assistant Professor of Romance Languages*

David Williams Carpenter, Ph.D.
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John W. Cell, Ph.D.
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*James B. Duke Professor of English*

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*University of Tennessee*

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*Professor of English*

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*Professor of Forest Biometry*

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*Professor of Philosophy*

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*Assistant Professor of Latin*

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Grover C. Smith, Ph.D.
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Robert S. Smith, Ph.D.
*Professor of Economics*

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*Professor of Education*

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*Assistant Professor of Education*

Robert Oscar Swan, A.M.L.S.
*Lecturer in Hindi-Urdu*

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Edgar Tristram Thompson, Ph.D.
*Professor of Sociology*

E. Clifford Toren, Jr., Ph.D.
*Assistant Professor of Chemistry*

Elias Torre, Doctor en Filosofia y Letras
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Richard Lovejoy Tuthill, Ed.D.
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*Virginia Polytechnic Institute*

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*University of North Carolina*

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Paul Welsh, Ph.D.
*Professor of Philosophy*

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*Assistant Professor of Religion*

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Mrs. Janet Winecoff, Ph.D.
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*Instructor in Classical Studies*

William P. Yohe, Ph.D.
*Associate Professor of Economics*

# *To Former Students and Prospective Students of the Summer Session*

The Summer Session at Duke University makes available to Duke students, to students from other universities and colleges, to teachers in elementary and secondary schools, and to other special students a notable program of instruction in many fields of knowledge, both academic and professional.

Course programs offered during the summer are designed to meet special and particular needs as well as the more conventional requirements leading to specific degrees.

**Undergraduates of Duke University** who desire to accelerate their programs may complete the work for a degree in three years by attending two and one-half Summer Sessions.

**Graduates of accredited high schools,** both men and women, who have been admitted to the freshmen class of Duke University may begin their work in the Summer Session.

**Undergraduates from other colleges and universities** may enjoy the special advantages of summer instruction at Duke and transfer earned credits to their own institutions.

**Graduate students who have been admitted to the Graduate School** to study for the Master of Arts, Master of Education, and Master of Arts in Teaching degrees will find courses arranged in sequence from summer to summer to meet their requirements.

**Teachers from elementary and secondary schools** who desire to earn credits toward the renewal of their certificates and who are interested in further teacher training in subject content and method may enroll in senior-graduate courses as special or unclassified students.

While the summer course program meets in many departments the needs of degree candidates, it goes beyond these limits in presenting also courses of wide general interest and, in addition, special non-credit lectures, conferences, institutes, and workshops.

Duke University's ample and modern research facilities will be available during the summer to all properly qualified students. It is the hope of the University, of the summer faculty, and of the administrative officers that former students and new students will find increasing values in each summer spent at Duke.

THE DIRECTOR

# Admission

Students in the following categories may be admitted to the Duke University Summer Session:

1. Graduates and undergraduates who are presently enrolled and in good standing in Duke University.
2. Graduates and undergraduates who have been formally admitted, or re-admitted, to Duke University.
3. Students who are currently in good standing at their respective institution and who have approval by the proper authority to take and transfer credits earned in the Duke Summer Session.
4. Teachers in service with or without the Bachelor's degree who wish to earn credits for certification purposes.

Admission to specific courses offered in the Summer Session is governed by the student's academic status (freshman, sophomore, junior, senior, graduate, special or unclassified) and by the prerequisites of the course in question.

## *Students in Residence at Duke University during the Spring Semester 1964*

A Duke University student, either graduate or undergraduate, who plans to attend the Summer Session should at the time of pre-registration for the fall semester (see p. 21 for specific dates) enroll for the desired Summer Session courses. He need *not* file with the Summer Session the application blank at the end of this *Bulletin*.

## *Students Not in Residence at Duke University during the Spring Semester 1964*

UNDERGRADUATES. New students seeking to enter Duke University as freshmen or as undergraduates with advanced standing, and undergraduates who wish to re-enter the University should write the Office of Admissions requesting regular application forms.

Undergraduates, both men and women, enrolled in other colleges and universities who desire to earn in the Duke University Summer Session credits which are to be transferred to their own institutions

should apply directly to the Director of the Summer Session, Duke University, on the application form at the end of this *Bulletin.* They should give accurately and clearly all information called for on the application form.

GRADUATES. Students with graduate standing and teachers in service with or without the Bachelor's degree who wish to earn credits toward the renewal or the advancement of their certificate and who do not wish to become candidates for a degree at Duke University should apply to the Director of the Summer Session on the application form at the end of this *Bulletin.*

Graduate students who are seeking admission to the Graduate School of Arts and Sciences and those who have been admitted to the Graduate School must apply to the Director of the Summer Session on the application form at the end of this *Bulletin.* Those who are seeking admission to the Graduate School *must also file* Graduate School application forms which may be secured by writing to the Dean of the Graduate School, Duke University, Durham, North Carolina.

## *Admission to Degree Candidacy*

Credits earned during the Summer Session may be applied toward the requirements of a degree.

UNDERGRADUATES. A student seeking to enroll as a candidate for the Bachelor's degree from one of the colleges of Duke University must meet the entrance requirements set forth in the *Bulletin of Undergraduate Instruction* and be accepted by the Director of Admissions. This *Bulletin* may be secured by writing the Office of Admissions, Duke University.

GRADUATES. A student seeking to enroll as a candidate for one of the advanced degrees offered by the Graduate School of Arts and Sciences of Duke University must meet the requirements set forth on pages 34-41 of this *Summer Session Bulletin.*

## *Admission of Veterans*

All veterans who plan to attend Duke University for the first time during the Summer Session of 1964 should have a Certificate for Education and Training ready to present at the time of registration. This form may be secured by applying to the Veterans' Administration. In the event a student has previously been enrolled under the G. I. Bill of Rights and his last enrollment was at Duke University no Certificate is necessary. Any correspondence should be addressed to: The Veterans' Office, Allen Building, Duke University, Durham, N.C.

# Financial Information, Living Accommodations, and Medical Care

## *Fees*

The University Fee:
Covering registration, tuition, and medical care.....$35.00 per semester hour ($35.00 per unit in Graduate School)
Teachers in full-time service in Elementary and Secondary schools .....$15.00 per semester hour
Divinity School students approved by the Dean of that school .....$17.50 per semester hour

Laboratory Fees: (These where applicable are in addition to the University Fee.)
Marine Laboratory .....$10.00 per course
(For Marine Laboratory investigators' research table fees see Marine Laboratory Bulletin.)

Fees Replacing University Fee:
Medical Mycology .....$100.00

Master's Degree Summer Session Fee:
A candidate for the Master's degree who completes in the Summer Session 15 or more semester hours required for the degree and who finishes the work in the Summer Session pays a degree fee of.....$25.00
A Master's degree candidate who is not required to pay the fee under Item 1 above, but who takes a thesis examination during the Summer Session, is required to pay a degree fee of .....$10.00
A Master's degree candidate who, in the fall or spring semesters, completes 15 or more semester hours required for the degree and who finishes the work in the Summer Session without a thesis examination is not required to pay the degree fee.

Auditing Fees (See p. 24 for definition):
1. Students registered for a full course program may audit non-laboratory courses (with the permission of the Director) at no extra charge.
2. Students carrying less than a full course program may be granted permission to audit a course or courses on payment of half the University fee per semester hour audited .....$17.50 per s.h.

Late Registration Fee:
Students who fail to register prior to the first class day of a given course will pay an extra fee of .....$ 5.00

Fee for Course Changes:
Course changes other than those required by the University will be made only on payment of an extra fee of .....$ 1.00

Fee for Make-up Final Examination .....$ 5.00

Refund of Fees:
a. When applications for withdrawal are received by the Director of the Summer Session before the close of registration on registration day, full fees will be refunded.

b. When applications for withdrawal are received by the Director of the Summer Session during the first four class days of a given term 80 per cent of the fees will be refunded.

c. When applications for withdrawal are received by the Director of the Summer Session after the fourth class day there will be no refund of fees.

## *Student Aid*

SPECIAL FEES TO TEACHERS: Teachers in full-time service in elementary and in secondary schools, who are accepted by the Summer Session, pay only $15.00 per semester hour. Teachers on leave of absence from their schools and teachers not currently employed are not eligible for this special fee.

SCHOLARSHIPS FOR PUBLIC SCHOOL PERSONNEL: Duke University will offer thirty-six special scholarships of $150.00 each to high school and elementary teachers on a competitive basis (not by a written examination) for the Summer Session of 1964. This scholarship program is designed to encourage teachers to begin or to continue their graduate studies leading to the A.M., M.Ed., or M.A. in Teaching degree.

Duke University will again offer six special scholarships of $200.00 each to high school and elementary administrators and supervisors. This scholarship program is designed to encourage principals and supervisors to continue their graduate studies leading to advanced degrees.

Although successful applicants for the scholarships will not be required to become candidates for a degree, they must qualify for and receive admission to the Graduate School of Arts and Sciences.

All applications with supporting documents must be submitted by April 1, 1964. Selection and appointment of scholars will be completed by May 1, 1964.

Application blanks and complete information may be obtained from the Director of the Summer Session, Duke University, Durham, North Carolina.

LOANS: A number of loan funds have been established for the benefit of the students of Duke University. Several of these funds are available to students enrolled in the Summer Session. These funds are administered through a committee of officers of the University.

The Committee, in approving loans, selects those students who, from the standpoint of character, scholastic attainment, and degree of financial need, are deserving of consideration.

Applicants for loans should make application to the Manager, Student Loan Office, Duke University. All applications must be initiated during the first week of each term. The granting or withholding of a loan is a matter entirely within the discretion of the

Student Loan Committee. A student is expected to use all other possible means of securing financial assistance before applying for aid from a loan fund.

NATIONAL DEFENSE EDUCATION ACT LOANS: A limited number of loans may be made, under the provisions of the National Defense Education Act of 1958, to students in the Summer Session who have been regularly enrolled in the University prior to the Summer Session. Inquiries concerning opportunities available under this program should be addressed to the Manager, Student Loan Division, Duke University.

REMISSION OF TUITION: Children of ministers who are members of the North Carolina and Western North Carolina Conferences of the Methodist Church are entitled to a remission of the tuition charge as are the children of ministers of all faiths residing in Durham County, North Carolina. This consideration is given only to the children of resident members of the two North Carolina conferences who are giving their full time to religious work. The remission of the tuition charge during the Summer Session is valued at one-half of the tuition charge. Only those students enrolled in a regular undergraduate program leading to a baccalaureate degree from Duke University are entitled to this benefit. Students in this group are entitled to a maximum of eight semesters of free tuition at the undergraduate level. Application for this benefit should be made to the Director of Financial Aid, Duke University.

TUITION GRANTS: Tuition grants are available to children of qualified staff members of Duke University. Information regarding the tuition grant program may be obtained by writing to the Director of Financial Aid, Duke University.

## *Residence Hall Accommodations*

The residence hall facilities of Duke University will be available to Summer Session students. The Men's Graduate Center will be used for graduate and professional men students enrolled in the Summer Sessions; however, the dining hall will not serve meals during the Summer Session.

The Duke University Apartments will be available to married students enrolled in the Summer Session. Information concerning Duke University Apartments will be supplied by the Housing Bureau upon receipt of your request.

UNDERGRADUATES, both men and women, are required to live in the residence halls unless they are married or are living with parents or relatives. Any exception must be approved in advance by the Dean

of Undergraduate Women or the Dean of Undergraduate Men as the case may be.

The majority of the rooms are double rooms furnished for two persons. A limited number of rooms are single and are furnished for one person. The Housing Bureau will convert a double room to a double-single and furnish it for occupancy by one person. Furniture consists of single beds with mattresses, an individual clothes closet for each person, a chest of drawers for each person, a study table, chairs, bookcase, wastebasket, and window shades. Linens, blankets, towels, and pillows are not furnished by the University.

The Marine Laboratory, located on Pivers Island adjoining the United States Bureau of Fisheries across the Newport River from Beaufort, North Carolina, has four cottage-type residence halls which will be available for Summer Session students. All rooms in the Marine Laboratory residence halls are equipped for two persons. There is a separate building for dining and social activity.

## *Residence Hall Rooms—Rates*

| | | | |
|---|---|---|---|
| Single Room | 5 weeks' term | $41.25 | |
| | 4 weeks' term | 33.00 | |
| | 3 weeks' term | 24.75 | |
| | 1 week's term | 8.25 | |
| Double Room | 5 weeks' term | $70.00 | $35.00 per person |
| | 4 weeks' term | 56.00 | 28.00 per person |
| | 3 weeks' term | 42.00 | 21.00 per person |
| | 1 week's term | 14.00 | 7.00 per person |
| Double Room furnished as a Single Room and Occupied by one person | 5 weeks' term | $56.25 | |
| | 4 weeks' term | 45.00 | |
| | 3 weeks' term | 33.75 | |
| | 1 week's term | 11.25 | |

Applications for room reservations accompanied by the full amount of the room rent for the term concerned should be made to Duke University Housing Bureau, Duke Station, Durham, North Carolina. Rooms will be reserved in the order in which applications are received. Notification of assignment to rooms will be made about May 30 for the first term; about July 10 for the second term, if the Summer Session Office can certify admission to the Summer Session term.

Rooms are available to applicants twenty-four hours prior to the registration for a specific term of the Summer Session. A room is to be vacated by the occupant within twenty-four hours after his final examination. Any period of occupancy other than for a specific term of the Summer Session must be arranged for at the Office of the Housing Bureau, Craven Quadrangle, D-101R.

### Refund of Room Rent:

a. When notification for room cancellation is received by the Housing Bureau on or before fifteen (15) days prior to the registration date of the Summer Session term, full room rent will be refunded.

b. When notification for room cancellation is received between the fifteen (15) days prior to registration date and the first four class days, 80% of the room rent will be refunded.

c. When notification for room cancellation is received after the first four days of a Summer Session term, 70% of the room rent for the unused period will be refunded.

Applicants should be sure to express their preference as to roommates, if they have a preference. If no preference of roommate is expressed, the Housing Bureau will assign a roommate; however, the Office does not assume responsibility in this matter.

Estimated cost of one term of Summer Session:

| | |
|---|---|
| University Fee, 6 s.h. | $210.00 |
| Teachers (elementary and secondary) in full-time service, ~~$75.00~~ 90.00 | |
| Dormitory Rooms (2 occupants, $35.00 per person) | 35.00 |
| Meals (Cafeteria selective; average per day $2.00) | 72.00 |
| Books and Class Materials $7.00 to $10.00 | 8.50 |
| Miscellaneous (laundry, etc.) | 12.00 |
| Total (elementary and secondary teachers in full-time service deduct $120.00) | $337.50 |

## *Medical Care*

The Student Health Service, in the Duke Medical School Building operates during the Summer Session and offers exactly the same medical and surgical services available to each full-time student during the academic year, as described completely in the Undergraduate Bulletin, but covers only *six days* of hospitalization in each term of Summer Session residence.

With the exceptions noted below, this service, under the direction of the University Physician, and with the cooperation of the staff of Duke Hospital, furnishes full medical and surgical care, drugs, dressings, x-ray work, and ward, but not special nursing, for any acute illness or injury at no additional cost beyond the University fee for each term of residence or any shorter period. The cost of braces and necessary orthopedic appliances and of blood, as well as special nursing, must be borne by the student. A charge for meals ($1.80 per day) will be made while the student is in the Hospital. All necessary telephone and telegraph charges will be borne by the student. If students have insurance providing hospitalization, surgical or medical benefits, these benefits shall be applied to the cost of their medical care. Refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions such as diseased tonsils, hernias, elective surgery, chronic skin conditions, endocrine disturbances, etc., or accidents

or illness occurring during vacations or while off the campus are not included in this service.

No illness is treated in dormitory or other rooms occupied by students. Students needing treatment for minor medical or surgical conditions have the facilities of the Student Health Office in the Hospital between 9:00 a.m. and 5:30 p.m. on week-days. Emergency room care is available at night and on Saturday afternoons and Sundays. For admission to the Hospital, or for x-ray and consultation services, a student *must* present the 1964 Summer Session Student Identification Card as evidence that he is matriculated in the Summer Session and entitled to hospitalization. Students who register for less than 3 semester hours' credit are not entitled to medical care without charge.

# Registration

## *Definition of Terms*

REGISTRATION. A student has completed registration for the Summer Session when:

1. His course program has been written and approved by the dean of the school or college in which he is enrolled or by the Director of the Summer Session in the case of the special or unclassified student.

2. Summer Session forms have been completed properly by the student in the Summer Session Office.

3. Summer Session University fees have been paid. A place in a course cannot be assured until fees have been paid. Tuition bills are not sent to the student's home.

PRE-ENROLLMENT. The term pre-enrollment refers only to the writing of the course program and its approval by the proper authority or by the Director of the Summer Session in the case of the special or unclassified student. *Pre-enrollment alone does not constitute registration.*

## *General Registration*

CLASSES BEGINNING JUNE 10. All Summer Session students whose classes begin on June 10, Term I, who *do not* complete registration in the Summer Session Office, 119 Allen Building, on or before June 5 *must* present themselves at general registration in Central Records Office, 103 Allen Building, on June 9 to register. Students will register during 30-minute periods alphabetically according to *surname* as indicated in the following table.

| *Time* | *Registrants (Surname)* |
|---|---|
| 8:30– 9:00 | **A–B** |
| 9:00– 9:30 | **C–E** |
| 9:30–10:00 | **F–H** |
| 10:00–10:30 | **I–L** |
| 10:30–11:00 | **Mc–N** |
| 11:00–11:30 | **O–P** |
| 11:30–12:00 | **Q–R** |
| 12:00–12:30 | **S–T** |
| 12:30– 1:00 | **U–Z** |

CLASSES BEGINNING JUNE 16. All Summer Session students whose classes begin on June 16, Term I, must complete registration in the Summer Session Office, 119 Allen Building, on or before June 15.

CLASSES BEGINNING JULY 17. All Summer Session students who wish to register for courses offered during Term II or for research during Term II may register in the Summer Session Office on July 3 through July 11. All students who *do not* register for second term during this period *must* register in Central Records Office, 103 Allen Building, on July 16, between 8:30 a.m. and 1:00 p.m.

CLASSES BEGINNING ON OTHER DATES. All Summer Session students registering for courses beginning on dates other than those specified above must complete registration in the Summer Session Office *before* the date on which their classes begin. *Registration on the day on which classes are scheduled to begin will be considered late registration.*

## *Late Registration*

Any student who fails to register on or before the dates specified in the preceding paragraphs will be charged a fee of $5.00 for late registration. No student will be permitted to register for a 3 semester hour course after the third class day (June 12, Term I: July 20, Term II); a 4 semester hour course after the second class day (June 17, Term I; July 20, Term II). Changes in courses other than those required by the University will require a payment of $1.00 for each change made. All changes must be approved by the dean of the school or college in which the student is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session. These registration rules are enforced rigidly.

Since Summer Session courses present a program of study in more concentrated and rapid form than in the regular semesters, students are advised to register on time and to be present at all class sessions.

## *Advance Registration*

STUDENTS IN RESIDENCE AT DUKE UNIVERSITY DURING THE SPRING SEMESTER 1964.

Writing Course Programs in the Schools and Colleges. Students in residence at Duke University during the Spring Semester, 1964, both graduate and undergraduate, who plan to enroll for courses offered in the 1964 Summer Session or to carry on research during the period of the Summer Session will write course programs and have

them approved in their respective schools or colleges during the week of pre-registration, April 7-10, 1964, except Divinity School students who will register on April 22-23.

ADVANCE REGISTRATION IN THE SUMMER SESSION OFFICE. Students in residence whose course programs have been written and approved by their respective colleges on the dates indicated above may complete their registration in the Summer Session Office, 119 Allen Building, on the following dates:

Graduate and undergraduate students—May 11 through June 5

Registration in the Summer Session Office includes:

1. Completion of various Summer Session forms.
2. Payment of University fees.

A student who registers with the Summer Session Office during this period will not be required to be present at general registration on June 9. He will begin his class work on the date his classes are scheduled to begin: June 10 or June 16.

STUDENTS NOT IN RESIDENCE AT DUKE UNIVERSITY DURING THE SPRING SEMESTER, 1964.

ADVANCE REGISTRATION BY MAIL. Students not in residence at Duke University during the Spring Semester, 1964—new undergraduate students seeking to enter as degree candidates, graduate students who are not candidates for an advanced degree at Duke University, graduate and undergraduate students of other colleges and universities desiring to earn credits for transfer, public school teachers and college teachers (not advanced degree candidates)—may register by mail. Advance registration by mail includes:

1. Completion in full of the application form at the end of this *Bulletin.*

2. Admission to the Summer Session by the Director of the Summer Session and, in the case of students seeking to enter Duke University as degree candidates, admission by the Admission Directors to the school or college of Duke University concerned.

3. Completion in full and return of forms required by the Summer Session Office by June 5.

4. Payment of University fees by June 5. A student may *pre-enroll* by mail without paying the University fees but he *cannot register in advance* without doing so.

Students who complete registration by mail on or before June 5 need not be present at the general registration on June 9.

DEGREE CANDIDATE GRADUATE STUDENTS NOT IN RESIDENCE DURING THE SPRING SEMESTER 1964. All graduate students not in residence during the Spring Semester, 1964, who are candidates for an advanced degree in the Graduate School of Arts and Sciences of Duke University *must* present themselves for registration in Central Records Office, 103 Allen Building, on June 9. They cannot complete registration by mail because:

1. Their program of study for the summer must be approved by their Director of Graduate Studies.

2. Their course programs must be written and approved by the Graduate School of Arts and Sciences.

*These students may pre-enroll by mail with the Summer Session Office and may pay their fees in advance, but they cannot complete their registration.*

# Academic Regulations

## *Kinds of Course Enrollment*

SUMMER SESSION courses may be taken for "credit" or for "non-credit" or may be "audited." A student's program may be exclusively in one of these categories, or may combine any two of them or all three. Students taking a full or partial program for "credit" may enroll as auditors or as non-credit students in any number of additional courses.

CREDIT. The Summer Session term "credit" does not mean degree credit at Duke University unless the student has been admitted as a degree candidate by one of the colleges or schools of the University. A student taking a course for credit is expected to do all the work required and to take the final examination, and he will receive a grade. G.I. Bill benefits are available only to those veterans who enroll for credit.

NON-CREDIT. "Non-credit" enrollment is available to the student who wishes the privilege of participating in class discussions, exercises, and the laboratory assignments but does not wish to take the examinations, either mid-term or final. A "non-credit" student may do as much of the work of the course as he desires, but he may not take the final examination and he will not receive a grade. Full fees of $35.00 per semester hour are required in "non-credit" enrollment.

AUDIT. An auditor is entitled to listen to lectures and class discussions, but he may not participate in discussions or take examinations. Students may not enroll as auditors in laboratory courses. A student carrying a full program for credit may be given permission to audit as many courses as he desires without additional fees. Students carrying less than a full program for credit may secure permission to audit but are required to pay the auditing fee of $17.50 per semester hour.

## *Eligibility for Course Enrollment*

Courses numbered 1-49 are primarily for freshmen, or freshmen and sophomores. Courses numbered 50-99 are ordinarily for sophomores, or sophomores and juniors. Courses numbered 100-199 are designed for juniors and seniors. Courses numbered 200-299 are planned for seniors and graduates. Courses numbered 300 up admit graduate students only. Courses numbered from 200 up are limited in enrollment to 25 students.

## *Credits Allowed in Summer*

The Summer Session courses are of the same quality and credit values as courses in the regular semester. Credit earned in the Summer Session is in terms of semester hours. The majority of Summer Session courses carry 3 semester hours' credit and require one term in residence. A limited number of basic courses in the sciences carry 4 s.h. credit (Chemistry, Geology, Physics, Zoology).

## *The Normal Course Program*

The normal and maximum program for one term of the Summer Session is 6 semester hours, except in cases where students take a 4 semester hour language course. In those cases 7 semester hours per term will be allowed. The 4 semester hour courses in the sciences run for four weeks and one such course constitutes a full course program. Four semester hour courses in the sciences do not meet on Saturdays.

## *Grading*

Only a student taking a course for credit will receive a grade. The grade given represents the quality of the work done in the course.

PASSED.

| *Undergraduate Grades* | *Graduate Grades* |
|---|---|
| A—excellent | E—exceptional |
| B—good | G—good |
| C—average | S—satisfactory |
| D—poor but passing | |

FAILED. A grade of F indicates that the student has failed the course, and in order to receive credit for the course he must repeat the work in class.

INCOMPLETE. A grade of I may be reported by the instructor if for any reason he is unable to report the final grade at the regular time. Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is recorded as F, and the course must be repeated in class if the student is to receive credit for it.

ABSENT FROM FINAL EXAMINATION. The grade X indicates that the student was absent from the regularly scheduled examination. A student absent from examination, if the absence has been excused by the dean of the college or school in which he is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session, may receive an examination upon the payment of $5 to the Treasurer of the University. The instructor concerned arranges for the examination in cases where absences are excused. A student with an X grade who has not obtained a passing grade before the end of the semester following that in which the X was incurred is regarded as having failed in the course concerned and must repeat the work in class in order to receive credit. If a student's absence from an examination is not excused by the dean of the college or school in which he is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session, his grade for the course concerned is recorded as F.

## *Dropping of Courses*

If a student drops a course without permission from the dean of the school or college in which he is enrolled or, in the case of the special or unclassified student, the Director of the Summer Session, the grade for that course is recorded as F. If he drops a course with permission, the grade for that course is F unless, in the judgment of the dean or director, circumstances do not justify this penalty.

## *Withdrawal from the Summer Session*

If a student wishes to withdraw from the Summer Session, he must notify both the dean of the school or college in which he is registered and the Director of the Summer Session.

## *Examinations*

Final examinations in courses are held on the last two days of each term. Final examinations for short courses which occupy the student's complete program will be held on the last day of the course. The examination dates for 1964 are:

First term: July 14-15.
Second term: August 20-21.

Courses in science for the first term have been scheduled so that their final examination will come on July 15. The science courses which begin July 17 and run for four weeks will have their final examination on August 14. The University has no provision for giving examinations *in absentia*. Students absent from examinations for valid reasons are permitted a liberal extension of time to return to the University for completion of credit.

## *Credits for Transfer*

A student desiring either graduate or undergraduate credits transferred from Duke University to his university or college as degree credit must request from the Director of the Summer Session, Duke University, a "Course Approval Form" to be completed by the student's Dean or Registrar and return to the Director of the Summer Session, Duke University.

## *Professional Credits Toward Teachers' Certificates*

Professional credits toward teachers' certificates are granted by the various state boards of education, each in accordance with its own carefully planned rules. Teachers in service, before enrolling for certification credit, should consult the rules laid down by their State Board of Education. If necessary, they should send to their State Board of Education a list of the courses in which they plan to enroll and inquire whether these will be acceptable for certification credit.

# University Services, Publications, and Student Activities

## *Appointments Office*

THE APPOINTMENTS OFFICE is maintained in Page Building the year around. The services of this Office are available without charge to students and teachers registered for a degree in Duke University and to school officials who may be seeking the services of new teachers. Students interested in securing employment through the Appointments Office should register with this Office.

## *The Bureau of Testing and Guidance*

The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling. Although the counseling, testing, and research services of the Bureau are designed primarily to meet the needs of the students, the faculty, and the staff of Duke University, these services are made available to individuals and organizations outside the University as its facilities permit. Requests for further information should be addressed to the Director, Bureau of Testing and Guidance, Duke Station, Durham, North Carolina.

## *Post-Doctoral Research*

Scholars engaged in post-doctoral research find it advantageous and sometimes essential to use in summer the resources of the Duke University libraries. The University welcomes these visitors and makes available to them the living accommodations of the dormitories and the dining halls during the Summer Session, June 9 to August 21. Application for these post-doctoral research privileges must be made in advance by letter to the Director of the Summer Session giving the applicant's present position, the specific field of his research interest, and the dates during which he desires to be in residence. Approved applicants will be accepted subject to the availability of library and of dormitory space.

## *The Sundial*

During the Summer Session the University will publish each Saturday *The Sundial,* an official calendar announcing events—academic, social and recreational—of the following week. This calendar also includes official notices concerning academic requirements. Students are expected therefore to read *The Sundial* regularly.

## *Recreation and Activities*

The Summer Session will provide a varied program of entertainment and recreation. These plans include movies, presented once weekly by Quadrangle Pictures, weekly summer dances and open house social evenings with games for those who do not care to dance. Tours to areas of interest can be arranged for week-ends. Both the mountains and the seashore are easily accessible. Adequate facilities are available for those interested in swimming, tennis, and other sports. State clubs organized for the summer play an active part in all social activities.

# Resources of the University



THE UNIVERSITY LIBRARIES, with 1,600,000 volumes and 3,000,000 manuscripts, provide exceptional resources and facilities for study and research by undergraduate and graduate students and visiting scholars. About 50,000 volumes are added annually, while 125 foreign and domestic newspapers and 7,000 periodicals are received currently. There is also a large collection of microfilms of rare books, newspapers, and periodicals. Study facilities are provided for 269 graduate students in air-conditioned stacks of the General Library.

All libraries of the University are open for use throughout the summer. A "Student's Guide to the General Library," and a brochure on "The Library of Duke University" which describes the building and collections in general detail are available on request addressed to the Librarian of the University.

The laboratories in the various Science Departments (Botany, Chemistry, Physics, Psychology, and Zoology) are designed for both teaching and research. Ideal locations for special work in some of the sciences are available at Duke University Marine Laboratory at Beau-

fort, North Carolina; at Highlands Biological Laboratory at Highlands, North Carolina; in the Duke Forest at Durham, North Carolina; and in the Sarah P. Duke Gardens on the West Campus of Duke University.

The Chapel, home of Duke University Church, interdenominational, is open all summer. The Church encourages the cultivation of the spiritual and moral life of students through participation in the service of worship which is held each Sunday morning at eleven o'clock. The pulpit is occupied by a regular University Preacher, or a special visiting preacher. Choral music for these services is provided by a volunteer student choir.

Organ recitals are presented periodically by the University Organist, and Carillon recitals twice a week, on Sunday afternoon and Thursday evening, by the University Carillonneur.

# Special Conferences and Courses

SPECIAL PROGRAMS FOR TEACHERS OF SCIENCE AND MATHEMATICS: It is anticipated that the Summer Session will offer a number of special programs at the graduate level designed specifically for high school teachers of science and mathematics. For detailed information on the programs, teachers should write Dr. Thomas Reynolds, Mathematics Department, Duke University, Durham, North Carolina.

CONFERENCE ON SCHOOL LAW: A conference on school law will be held on Duke University campus on June 16-17. The program is planned for the benefit of administrators and teachers in schools and colleges. Speakers and consultants well known in the field of school law will participate in the two-day conference.

CONFERENCE ON ELEMENTARY EDUCATION: JUNE 11-12, 1964. This conference is the tenth of a series of conferences dealing with various areas of learning in the elementary school. The areas of learning to be considered in this conference will be health education and physical education. Dr. Ruth Evans, a recognized authority in her profession, will be the consultant and main speaker in the field of physical education. Mrs. Joanne Rae McGhee, a specialist in creative movement for children, will conduct a lecture-demonstration using a group of elementary school children. There will also be a specialist who will serve as consultant in the health education area. For further

information write to the Director of the Summer Session, Duke University, Durham, North Carolina.

EARTH SCIENCE WORKSHOP FOR ELEMENTARY TEACHERS: The Duke University Summer Session, with the cooperation of the Duke University Geology Department and the North Carolina State Department of Public Instruction, will offer a five-day workshop in earth science for elementary teachers on June 8-12.

The workshop will be instructional with emphasis on the identification, nature, and origin of minerals and rocks. Special field trips will be conducted in Durham and adjacent counties.

The opening class will be 1:30 p.m. on June 8, thereafter lecture sessions will be from 8:30 to 11:30 a.m. and laboratory sessions from 1:30 to 4:30 p.m. The workshop will terminate at 11:30 a.m. on June 12.

Enrollment is limited to North Carolina public school teachers. No previous training in geology is required.

Teachers who participate in this workshop will not be charged tuition or registration fees.

CONFERENCE ON MODERN MATHEMATICS FOR SEVENTH AND EIGHTH GRADE TEACHERS, JUNE 15-19: The conference on "Modern Mathematics" for seventh and eighth grade teachers, co-sponsored by the North Carolina State Department of Public Instruction and Duke University, will be held on the Duke Campus from June 15 to June 19. This conference will be content oriented. There are no tuition or registration fees. Since enrollment will be limited, teachers interested should register early. Address all correspondence to the Director of the Summer Session, Duke University, Durham, North Carolina.

SUMMER INSTITUTE IN ENGLISH: The Department of English in conjunction with the North Carolina State Department of Public Instruction will offer during Term I (June 10-July 15) an Institute for teachers of English in the secondary schools. The Institute will include instruction in Literature under Professor Grover Smith and in Linguistics under Professor Holger Nygard, with each teacher including instruction also in Composition. The Institute will follow the general plan of the Institute offered in the summer of 1962 in conjunction with the Commission on English of the College Entrance Examination Board. The syllabi prepared under the supervision of the Commission on English will be employed. The instruction will carry graduate credit which may be applied to a degree program here or elsewhere. The Institute will be limited to about thirty teachers, all of whom will receive full tuition scholarships. For further information write: Director, Summer Session, Duke University, Durham, North Carolina.

CONFERENCE OF THE NORTH CAROLINA ENGLISH TEACHER'S ASSOCIATION: The English Institute of the North Carolina English Teacher's Association will be held on the campuses of Duke University and the University of North Carolina during the Summer Session. Dates will be announced later. For further information write Professor F. E. Bowman, Department of English, Duke University.

SUMMER CENTER ON SOUTHERN ASIA: Duke University has concluded a contract with the United States Office of Education under the provisions of Title VI of the National Defense Education Act for the establishment at the University of a summer center for the intensive study of Hindi and Urdu and cognate courses. This program is part of the University's Program in Comparative Studies on Southern Asia, which is also supported in part by the Office of Education. During the two summer sessions, both Intensive Elementary Hindi-Urdu and Intensive Intermediate Hindi-Urdu will be offered. In addition, courses relating to Southern Asia will be offered in sociology-anthropology and political science, which will be open to both graduate and undergraduate students. Mr. Robert O. Swan, Lecturer in Hindi-Urdu, is the Director of the summer center. A limited number of fellowships are available for undergraduate students taking Intermediate Hindi-Urdu. Interested persons should write to Dr. Olan Petty, Director of the Summer Session, Duke University.

HIGHLANDS BIOLOGICAL STATION: Duke University holds a subscribing instructional membership in the Highlands Biological Station at Highlands, North Carolina, on the southern edge of the Blue Ridge Mountains at an elevation of 4,118 feet. The situation and the region offer an excellent opportunity for field studies and limited laboratory work. A limited number of qualified students in Botany and Zoology may make arrangements to carry out research at this station.

MEDICAL MYCOLOGY: A month's course in Medical Mycology, under the direction of Dr. Norman F. Conant, is to be offered at Duke University School of Medicine and Duke Hospital, June 29 to July 25, 1964. The course will be offered every day in the week, except Sunday, and has been designed to insure a working knowledge of the human pathogenic fungi within the time allotted.

Emphasis will be placed on the practical aspects of the laboratory as an aid in helping establish a diagnosis of fungus infection. Insofar as possible and as patients become available, methods of collecting materials in the clinic for study and culture will be stressed. Work with patients, clinical material, cultures and laboratory animals will serve as a basis for this course. Also, an opportunity to study pathologic material, gross and microscopic, will be given those whose pre-

vious training would allow them to obtain the greatest benefit from a study of such material.

The enrollment for the course will be limited and the applications will be considered in the order in which they are received. An attempt will be made, however, to select students on the basis of their previous training and their stated need for this type of work.

A fee of $100.00 will be charged for this course, upon the completion of which a suitable certificate will be awarded. Please direct inquiries to Dr. Norman F. Conant, Professor of Microbiology, Duke University School of Medicine, Durham, North Carolina.

THE METHODIST COURSE OF STUDY SCHOOL: The sixteenth session of the short-term school for Methodist ministers taking the required Course of Study will be conducted during the period, July 13-August 7, 1964. While this school is designed primarily for Supply Pastors and other non-seminary candidates for the Methodist ministry, clergymen of any denomination may enroll. The curriculum as approved by the 1960 Methodist General Conference will be followed, which will include Studies for License to Preach, Introductory Studies and the Studies for the First, Second, Third, and Fourth Years.

In addition to class work, there is provision for daily worship in Duke Chapel and a number of special lectures and workshops. A varied program of recreation and athletics will be supervised by the University Department of Physical Education.

Registration is scheduled for July 13. Classes begin on the morning of July 14 and continue through August 7, including Saturdays. A descriptive folder giving details of the School will be ready for distribution about February 1, 1964, and copies may be procured by writing to Professor W. A. Kale, Director, Box 4353, Duke Station, Durham, N. C.

## *Divinity School Summer Clinics*

Three clinics, Preaching, Pastoral Care, and Rural Church Work will be held simultaneously, July 20-31, 1964. Costs include: Registration Fee, $10.00, Tuition, $40.00, and Board and Room. All participants are eligible for Tuition Grants. In addition, Methodist Ministers in North Carolina may inquire about special grants provided by agencies of the Annual Conferences to cover costs. Registration is open to ministers of all denominations. No academic credit is given

PREACHING: This is the seventh Clinic in Preaching to be held at Duke. Registration is limited to eighteen in number, preferably restricted to active ministers and chaplains who have been out of seminary five years or more. The Clinic will concern itself mainly

with principles of sermon construction and delivery, giving ample opportunity for the participants to preach for critique. Matters of common concern for preachers will be discussed in plenary sessions. For registration information write to Professor Thor Hall, Director.

PASTORAL CARE: The Clinic in Pastoral Care has as its theme the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the Chaplains to the Duke Medical Center forms an integral part of the program. For registration information write to Professor Richard A. Goodling, Director.

RURAL CHURCH: The Rural Church Clinic will consist of intensive training, study, and planning in the area of the church's responsibilities in the town and country community, giving particular emphasis to the development of an indigenous leadership. For registration information write to Professor M. Wilson Nesbitt, Director.

# Graduate Study in the Summer Session

Summer Sessions offer an excellent opportunity to advance or complete programs of graduate study already undertaken, to begin study toward a graduate degree at Duke University, to acquire graduate training useful in professional advancement, or to study for personal satisfaction. The several departments offer a variety of graduate courses, as listed in later pages, given by members of the Duke faculty and visiting professors. Especially full programs are provided in Botany, Education, English, History, Psychology, Sociology, and Zoology.

*Students Not Seeking Admission to the Graduate School.* Any student who holds an A.B. or B.S. degree and who does not intend to earn an advanced degree at Duke University but who desires graduate work for professional or other reasons should apply to the Director of the Summer Session for admission as an unclassified student. Credit earned by an unclassified student will serve all usual purposes except that it will not count toward an advanced degree at Duke University.

*Students Seeking Admission to the Graduate School.* Admission may be granted to a student who has received an A.B. or B.S. degree from an accredited institution after a four-year course of study. The undergraduate record should be well rounded and of such quality as to give evidence of real capacity for success in graduate study. A student who seeks admission should 1) secure an application blank from the Graduate School and promptly return it with the required information, 2) have mailed directly from the registrar of each college he has attended to the Dean of the Graduate School at Duke University an official transcript of all his undergraduate or graduate work, 3) have mailed to the same official at least two, and preferably three, letters of recommendation from persons best qualified to appraise his capacity for graduate study.

In addition, many departments welcome, the departments of Economics and Psychology strongly advise, and the departments of Biochemistry and Philosophy require, submission of scores on the aptitude and advanced test in major subject of the Graduate Record Examination. If possible, the student should take this examination before his intended registration. Arrangements can usually be made through

officials at the student's college or by correspondence with the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. Should a student be unable to take the examination before the final admission date, he may—if his other documents are acceptable—be granted "provisional" admission until he takes the examination, which he must arrange to take at the first time it is offered after his "provisional" admission. Students admitted to the Graduate School will be so notified by the Director of Admissions.

So that applications for admission to the Graduate School for summer work may be given full consideration, the student must submit all required documents to the Dean of the Graduate School at least ONE MONTH before the date of intended registration. No student may register with the Graduate School until his application has been completed and admission has been granted.

## *Registration of Graduate Students*

Graduate students in residence during the spring semester will pre-register for either or both terms of the Summer Session on April 7-10. Other students who have been admitted to the Graduate School should present themselves for registration at the official registration period, June 9 for the first term, and July 16 for the second term. They are required to register both with the Summer Session and the Graduate School.

*Graduate students intending to remain in residence during either or both of the two Summer Session terms without registering for course work or research must register for one unit (one semester hour) to cover the cost of medical care and the use of University facilities. This one unit (one semester hour) of registration will entitle students to use the Student Health Service and University facilities during both terms of the Summer Session.*

## *Transfer of Graduate Credits*

1) For regulations concerning applying graduate credit earned elsewhere to a graduate program here, consult the *Graduate School Bulletin.*

2) The long-standing reciprocal agreement with the Consolidated University of North Carolina (see *Graduate School Bulletin*) is now effective during the respective Summer Sessions of this University and the University of North Carolina. It is restricted to a graduate student who has registered for a full program during at least one semester of the preceding academic year. Such a student by enrolling in the home Summer Session and paying its normal fees may register for a maximum of 3 semester hours at the other institution upon payment

of a nominal fee of $2.00. Credit so earned is not defined as transfer credit.

## *The Ph.D. and Ed.D. Degrees*

*Study for the Ph.D. Degree:* Students who are interested in working toward a Ph.D. degree should note in detail the requirements as outlined in the *Bulletin* of the Graduate School of Arts and Sciences. Requirements for the Ph.D. include one academic year of full-time residence.

*Study for the Ed.D. Degree:* Students who are interested in working toward an Ed.D. degree or for advanced certificates for principals and supervisors should consult the detailed statement in the *Bulletin* of the Graduate School of Arts and Sciences. Requests for specific information regarding residence and programs for the Ed.D. degree should be sent to the Director of Graduate Studies, Department of Education.

## *Requirements for the Master of Arts Degree*

*Language Requirements:* The candidate for the A.M. degree must have a reading knowledge of at least one foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) The language requirement may be satisfied by successfully passing an examination, officially conducted by the appropriate foreign language department at Duke University.

*Major and Minor Subjects:* As a prerequisite to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments have specific requirements for undergraduate preparation, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in the *Bulletin* of the Graduate School.

To complete the course requirements for the A.M. degree, the student must take 24 units of graduate courses, of which at least 12 must be in the major subject. Of the remaining 12 he must take 6 units of course work in a minor subject, leaving 6 units of course work to be taken in either the major or minor field, or in another field approved by the major departments and the Dean of the Graduate School. In addition to the course work, the student must present a thesis which carries a credit of 6 units. Thus, the total credit required for the A.M. degree amounts to 30 units.

*The Thesis for the Master of Arts Degree:* The thesis for the A.M. degree should demonstrate the student's ability to collect, arrange,

interpret or report pertinent material on his special research problem. Although a publishable document is not required, the thesis must be written in a literate style, and should exhibit the student's competence in scholarly methods and procedures.

*Regulations and Procedures:* Students expecting to complete all requirements for a Master's degree should file with the Graduate School office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Candidates completing requirements for a Master's degree without thesis should file the same official blank *one month* prior to completion of all degree requirements. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the student's major department.

Four typewritten copies of the thesis, in the spring binders provided by the Duke University Library, must be submitted, in approved form, to the Dean of the Graduate School at least *three to five days* before the date of the thesis examination. The copies will then be distributed to the several members of the examining committee.

*The Examining Committee and the Examination:* After consultation with the professor who has directed the thesis work, the Director of Graduate Studies in the major department appoints an examining committee composed of the director of the thesis as chairman and two other members of the graduate faculty, one of whom should represent the minor department. The committee composition is subject to approval by the Dean of the Graduate School. The candidate appears before this committee for an examination, which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies to this fact by signing the title page of the ribbon copy and first carbon copy of the thesis. The candidate then returns the original and first carbon copy of the thesis to the Dean of the Graduate School for binding and deposit in the University Library.

## *Requirements for the Master of Education Degree*

*Prerequisites:* The degree of Master of Education is granted ordinarily only to teachers or to others engaged in educational work.

Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

*Requirements for the Degree:* The M.Ed. degree may be earned either with or without the presentation of a thesis.

*Without Thesis:* The required work includes a departmental major (Elementary Education, Administration, Counseling, or Secondary Education) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. Permission to take such examination must be obtained from the Director of Graduate Studies of the Department of Education, and a notice of intention must be filed with him *at least two weeks* before the announced dates of the examination.

*With Thesis:* Students who elect this plan are permitted to substitute a thesis for 6 units of the required course work. The thesis subject must be approved by the professor who is to direct it and by the Director of Graduate Studies. Students expecting to complete all requirements for a Master of Education degree should file with the Graduate School Office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the Department of Education.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside the Department of Education. The remaining 6 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

The regulations concerning the writing and submission of the thesis, and the examination of it, are the same as those governing the thesis for the Master of Arts degree.

## *The Master of Arts in Teaching Degree*

*Prerequisites:* The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. In the event that a student wishes to undertake a graduate major different from the undergraduate major, the prerequisites may be modified upon the recom-

mendation of the student's committee and the approval of the Dean of the Graduate School.

*Programs for the Degree:* One of two programs may be arranged, in consultation with the student's committee:

A. A major in Education of 18 to 24 units and 6 to 12 units in courses outside the Department of Education.

B. A major in a department other than Education of 18 to 24 units and 6 to 12 units in Education.

In both programs a minimum of 30 units is required.

The non-education courses are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations concerning the writing and submission of the thesis, and the examination on it, are the same as those governing the thesis for the Master of Arts degree.

Candidates for the Master of Arts in Teaching who have not had teaching experience must major in Education and are required to take Education 215 (or 315) and 216, in which case a minimum of 36 units is required.

*The Committee:* Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in his major department, to plan his program of study.

This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another department. The chairman of the committee will normally be chosen from the department of the major.

## *Cooperative Program in Teacher Education*

Forty selected graduates of liberal arts colleges who desire to prepare for high school teaching will be admitted to a special internship program at Duke University. This program is designed to prepare for a teaching career selected college graduates who did not qualify professionally for teacher certification as undergraduates. The Cooperative Program provides, for candidates who are chosen, graduate study in their special fields, professional courses, and carefully supervised observation and teaching experience. One who completes the program

successfully can achieve within a period of fifteen months a year of teaching experience, a Master of Arts in Teaching degree, and full certification as a teacher.

Candidates will begin the program at the opening of the Summer Session of 1964 and complete it in August of 1965. They will spend the summer preceding and the summer following the year of teaching in residence at the University. During the school year 1964-1965 interns will be employed as regular teachers in a cooperating public school system. During this year they will receive full salary and will work under the joint supervision of the cooperating public school and the University. The program will meet training qualifications for the advanced, or graduate, teacher's certificate in many states.

The salary for the year of teaching will, in effect, constitute a substantial award to candidates selected for the program. Interns will benefit from Duke University's special tuition rate for teachers. Applicants will be considered, as are candidates for other awards, on a competitive basis. The best-qualified applicants will be chosen on the basis of undergraduate record, recommendations, and evidence of interest in becoming high-school teachers. Applicants are required to arrange interviews in connection with their applications. Application forms may be secured by addressing a request to the Dean of the Graduate School and must be submitted before February 15, 1964. Details concerning the program can be obtained by writing the Director, Cooperative Program in Teacher Education, Department of Education, Duke University.

## *Requirements for the Master of Science Degree*

*Prerequisites:* The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours' work in the major field.

*Foreign Language:* There is no foreign language requirement for this degree.

*Major and Minor Subjects:* The work for the Master of Science degree is designed to provide a broad basic foundation in the science of Civil, Electrical, or Mechanical Engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major area. He must also take a minimum of 6 units of minor work outside of engineering and 6 units in the major, minor, or another approved area. In addition to these he must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

*Regulations and Procedures:* The regulations and procedures and the provisions for examination and an examining committee are the same as those for the Master of Arts degree.

## *Candidacy for the Master's Degree*

To be considered as a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T.) the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during the first period of residence, he must make passing grades on the initial 12 units of graduate courses), (2) have made a grade of "G" or "E" on at least 3 units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T. of the supervisory committee).

## *Transfer of Credits*

Under certain circumstances a maximum credit in a Master's degree program of 6 units may be allowed for graduate courses completed elsewhere. Approval for the transfer of credits will not be given until the student has spent one semester or two terms in residence. The acceptance of credit up to this amount will not reduce the minimum period of full-time registered residence at Duke University. In no case will credit be allowed for extension or correspondence courses.

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer for credit may be permitted to register for as much as 12 units for thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 semester hours of further undergraduate training or 6 semester hours of required language courses on the undergraduate level.

## *Time Limits for Completion of the Master's Degree*

The candidate for a Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of his first registration in the Graduate School. Any candidate must complete all requirements within six calender years of his first registration.

# Undergraduate Study

UNDERGRADUATES in Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two and one-half summer sessions. By attending both terms of the Summer Session it is possible for a student to earn as many as twelve semester hours of credit. Instruction of interest to undergraduates will be offered in the summer of 1964 in most of the departments and colleges.

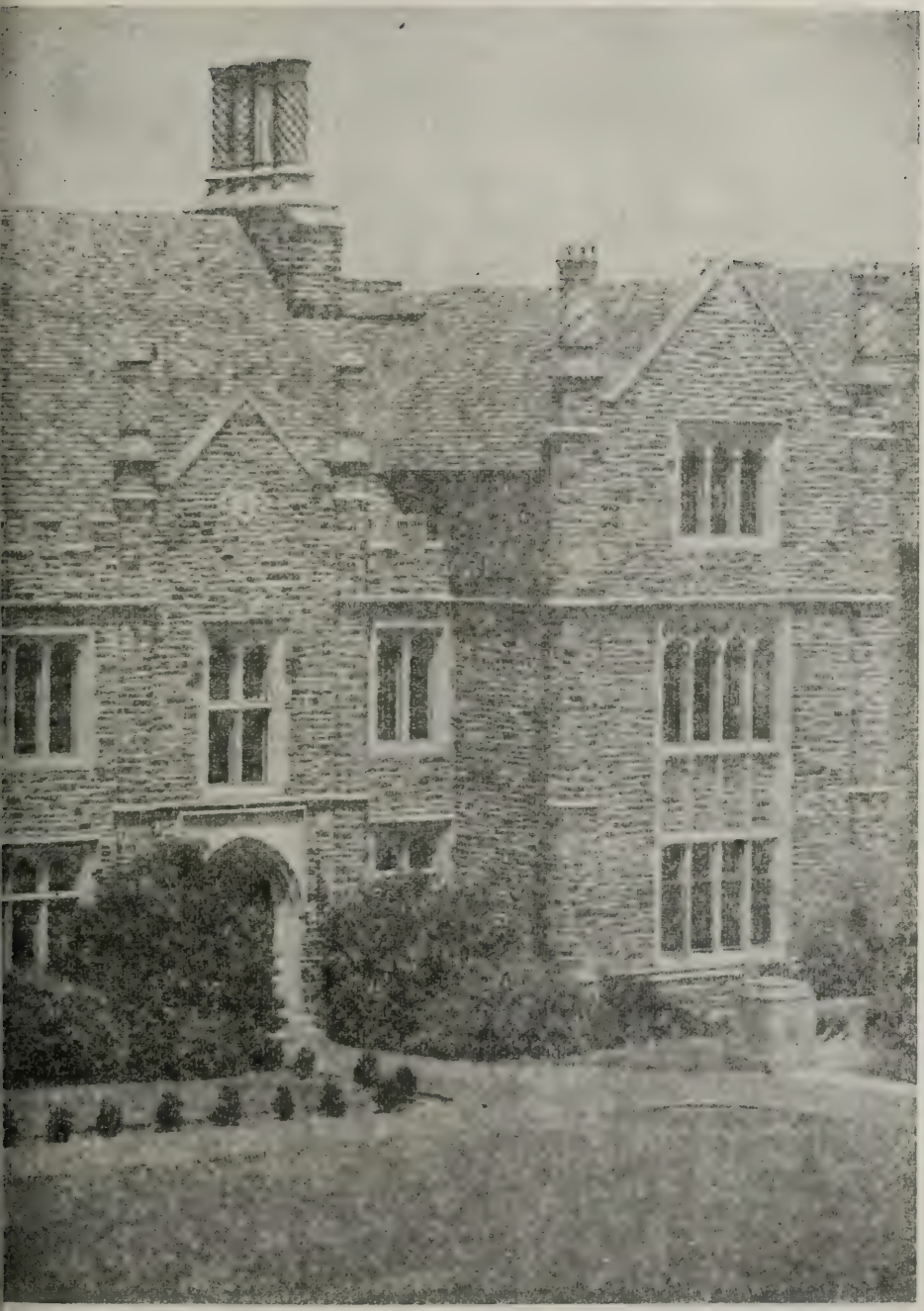
Undergraduates from other colleges and universities may enroll for summer instruction at Duke and transfer their earned credits to their own institutions.

# School of Nursing

The programs of the School of Nursing include courses in the Summer Session. Persons desiring to enroll in courses to meet the requirements of the School of Nursing programs must be regularly enrolled students. Students who have been admitted with Advanced Standing and who may wish to make up deficiencies in the Summer Session must have courses approved by the School of Nursing. Information about required courses is published in the regular *Bulletin of the School of Nursing*. For further information write to the Dean of the School of Nursing, Hanes House, Duke University, Durham, North Carolina.

# Divinity School Studies

BACHELOR OF DIVINITY, MASTER OF THEOLOGY, AND MASTER OF RELIGIOUS EDUCATION: The degrees of Bachelor of Divinity, Master of Theology, and Master of Religious Education are administered by the faculty of the Divinity School. A limited number of courses carrying credits toward these degrees is listed in this *Bulletin* under the heading of Religion. Persons desiring credit toward one of these degrees must be regularly admitted to the Divinity School, and all courses listed for Divinity School credit must be registered and approved in the office of the Divinity School. This school publishes its own Summer Session Bulletin, a copy of which may be secured by addressing The Office of the Dean, The Divinity School, Duke Station, Durham, North Carolina.



ENTRANCE TO THE DIVINITY SCHOOL

# Courses of Instruction

## *Minimum Enrollment Required for Courses*

All courses are offered subject to minimum enrollments. The University reserves the right to withdraw undergraduate courses in which fewer than twelve students enroll, senior-graduate courses numbered 200-299 in which fewer than ten students enroll, and graduate courses and seminars numbered 300 or above in which fewer than six students enroll. In withdrawing a course, the University attempts to avoid undue hardships on students. Sometimes, therefore, courses are offered in spite of small enrollments. Courses not listed will be given when a demand develops and an instructor is available.

## *Department Officers and Regulations*

Departments offering Summer Session programs are listed alphabetically. Under each department is given the name of the chairman and the name of the director of graduate studies. Where departments have set up special regulations for admission to candidacy for the Master's degree, these are included.

### Bbotany

ASSOCIATE PROFESSOR T. W. JOHNSON, JR., CHAIRMAN—141 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); PROFESSOR W. D. BILLINGS, DIRECTOR OF GRADUATE STUDIES—142 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

Students admitted to candidacy for an advanced degree in botany should have completed a minimum of 12 semester hours of courses in botany (or biology) beyond an elementary course, and related work in biological sciences. Students who have not yet had the minimum hours, however, may enter higher courses by permission of the instructor, if he is convinced that they can carry the work for undergraduate credit, and may count such work toward hours necessary for candidacy.

FIRST TERM (Duke Campus)

225. SPECIAL PROBLEMS.—Hours to be arranged. STAFF
359. RESEARCH.—Hours to be arranged. STAFF

FIRST TERM (Duke Marine Laboratory, Beaufort, North Carolina)

225. SPECIAL PROBLEMS.—Hours to be arranged. JOHNSON
359. RESEARCH.—Hours to be arranged. JOHNSON

SECOND TERM (Duke Campus)

226. SPECIAL PROBLEMS.—Hours to be arranged. STAFF
360. RESEARCH.—Hours to be arranged. STAFF

SECOND TERM (Duke Marine Laboratory, Beaufort, North Carolina)

211. MARINE ALGAE.—Classification, taxonomy, morphology, distribution, ecology, and economic uses of marine algae; preparation of herbarium material. In addition to collection, field work will provide students an opportunity to observe associations of marine algae *in situ* by means of diving equipment, if they wish to use it. 6 s.h. HUMM

226. SPECIAL PROBLEMS.—Hours to be arranged. HUMM AND JOHNSON

360. RESEARCH.—Hours to be arranged. HUMM AND JOHNSON

## CHEMISTRY

PROFESSOR J. H. SAYLOR, CHAIRMAN—115 CHEMISTRY BUILDING (WEST CAMPUS); PROFESSOR CHARLES K. BRADSHER, DIRECTOR OF GRADUATE STUDIES—124 CHEMISTRY BUILDING (WEST CAMPUS)

All classes in Chemistry, Term I, will begin on June 16 and continue through July 15. All classes in Chemistry, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Chemistry classes will not meet on Saturdays.)

### FIRST TERM

1. GENERAL INORGANIC CHEMISTRY.—Lectures, recitations, and laboratory work on the elementary principles of chemistry and on the occurrence, preparation, properties, and uses of the elements and their compounds. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BONK

61. FUNDAMENTALS OF ANALYTICAL CHEMISTRY.—A study of the relations of electrolytes in solution and of chemical equilibrium illustrated by laboratory experiments involving the techniques of gravimetric, volumetric, and colorimetric analysis. Prerequisites: Chemistry 1-2 and Mathematics 21 or equivalent. Lecture or recitation daily, 8:30-10:00; laboratory daily, 10:30-12:30 and 1:30-4:00. 4 s.h. TOREN

151. ORGANIC CHEMISTRY.—An introduction to the study of carbon compounds. Compounds of the aliphatic series form the basis of lectures, discussions and laboratory experiments. Prerequisite: Chemistry 61. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BROWN

275. THESIS RESEARCH.—Research in the fields of physical, analytical, inorganic, or organic chemistry. Open to those students whose research programs for the A.M. and Ph.D. degrees have been approved by the department and by one of the instructors in charge of the course. Schedule to be arranged. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) 2 to 8 s.h. Available Terms I and II.

### SECOND TERM

2. GENERAL INORGANIC CHEMISTRY.—A continuation of 1. Prerequisite: Chemistry 1. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BONK

152. ORGANIC CHEMISTRY.—A study of compounds of the aromatic series and of carbohydrates and proteins. Prerequisite: Chemistry 151. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. VINGIELLO

## CLASSICAL STUDIES

PROFESSOR ROBERT S. ROGERS, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES IN LATIN—204 CARR BUILDING (EAST CAMPUS); PROFESSOR JAMES N. TRUESDALE, DIRECTOR OF UNDERGRADUATE STUDIES IN GREEK—123 ALLEN BUILDING (WEST CAMPUS)

## GREEK

### FIRST TERM

121. GREEK LITERATURE: HOMER.—*Iliad* and *Odyssey*. The purpose of this course is to give a general survey of the life and civilization of the Greeks, especially to those who have never studied the language but wish to become acquainted with some of the choicest portions of the literature by the use of translations. The *Iliad* and the *Odyssey* are read in translation, and the excavations and discoveries at Troy and other cities of the Aegean age are discussed. 7:40-9:00. 3 s.h. STANLEY

122. GREEK LITERATURE: THE TRAGIC POETS.—The purpose of this course is similar to that of course 121. Many of the extant plays of Aeschylus, Sophocles, and Euripides are studied in English translations. 9:20-10:40. 3 s.h. STANLEY

## LATIN AND ROMAN STUDIES

### FIRST TERM

63. CICERO'S ORATIONS.—Selected orations of Cicero are read with attention to prose style. Prerequisite: Latin 1-2, or equivalent. 7:40-9:00. 3 s.h. WOOLEY

64. VERGIL'S AENEID.—Selections are read and interpreted, with due attention to prosody, and discussion of the literary excellence of the work. 11:00-12:20. 3 s.h. WOOLEY

111. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selected readings of Latin literature in English translation with emphasis on the drama, lyric poetry, and the varied contributions of Cicero to literature. 9:20-10:40. 3 s.h. SETTLE

112. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selected readings of Latin literature in English translation with emphasis on the epic, the satire, and the novel. 11:00-12:20. 3 s.h. SETTLE

## COMPARATIVE LITERATURE

### FIRST TERM

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 9:20-10:40. 3 s.h. SALINGER

## ECONOMICS

PROFESSOR ROBERT S. SMITH, ACTING CHAIRMAN—307 SOCIAL SCIENCE BUILDING (WEST CAMPUS); PROFESSOR FREDERICK C. JOERG, DIRECTOR OF UNDERGRADUATE STUDIES—316 SOCIAL SCIENCE BUILDING (WEST CAMPUS); PROFESSOR ROBERT S. SMITH, DIRECTOR OF GRADUATE STUDIES—304 SOCIAL SCIENCE (WEST CAMPUS)

### FIRST TERM

51. PRINCIPLES OF ECONOMICS.—A course in the essential principles of economic science. (Credit for Ec. 51 will not be given until Ec. 52 has been completed.) 9:20-10:40. 3 s.h. YOHE

57. PRINCIPLES OF ACCOUNTING.—Elementary principles of single proprietorship, partnership, and corporation accounting. June 10-June 26. 7:40-12:20. 3 s.h. PETHIA

58. PRINCIPLES OF ACCOUNTING.—A continuation of Economics 57. June 27-July 15. 7:40-12:20. 3 s.h. PETHIA

143. CORPORATION FINANCE.—Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57-58, Principles of Accounting, or Economics 60, General Accounting. 9:20-10:40. 3 s.h. JOERG

153. MONEY, CREDIT AND BANKING.—This course begins with a study of the nature, characteristics, and functions of money, credit and the commercial banking system. It covers also the history of commercial banking in the United States; the foundation, organization, and functions of the Federal Reserve System: the supervision and control of commercial banks; deposit insurance; and the value of money. 11:00-12:20. 3 s.h. YOHE

181. BUSINESS LAW.—The fundamental principles of law as applied to routine business transactions. The topics presented are: contracts, agency, and negotiable instruments. 7:40-9:00. 3 s.h. JOERG

SECOND TERM

52. PRINCIPLES OF ECONOMICS.—A continuation of Economics 51. 9:20-10:40. 3 s.h. SMITH

155. LABOR PROBLEMS.—An examination of present-day labor problems followed by an intensive study of methods used by employers and workers in meeting those problems. 11:00-12:20. 3 s.h. MRS. KREPS

189. BUSINESS AND GOVERNMENT.—A survey of the public policies which most directly affect the operation of competition in the business world. The course considers the leading philosophies of public control and economic development, the validity of their presuppositions, and their influence on legislation, court decisions and administrative law. 7:40-9:00. 3 s.h. MCGEE

268. COMPETITION AND MONOPOLY.—A detailed study of the varieties of imperfectly competitive markets, the economic and legal issues which they raise, and the policy solutions which have been attempted in the United States. 9:20-10:40. 3 s.h. MCGEE

## EDUCATION

PROFESSOR WILLIAM H. CARTWRIGHT, CHAIRMAN—08D WEST DUKE BUILDING (EAST CAMPUS); PROFESSOR EDWARD C. BOLMEIER, DIRECTOR OF GRADUATE STUDIES—08B WEST DUKE BUILDING (EAST CAMPUS)

Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.

For admission to candidacy for the Master of Arts (A.M.) degree with major in Education, or for the Master of Education (M.Ed.) degree, students must, in addition to meeting the general requirements for admission to the Graduate School, meet the following specific requirements: Credit for (1) eighteen semester hours of acceptable prior work in Education and (2) twelve semester hours of acceptable prior work in a minor field. If Psychology, Sociology, Economics, or Political Science is chosen for the minor, six semester hours of work completed after entering the junior year in college will be accepted.

The degree of Master of Arts is available in the divisions of School Administration and Supervision, Secondary Education, Elementary Education, and Guidance and Counseling. Every candidate for the Master of Arts degree in the Department should elect at least twelve semester hours in one of these divisions in which he plans to write his thesis and the remainder of his work, including the six semester hours in his minor, with the approval of the proper division adviser. The degree of Master of Education is available in the divisions of School Administration and Supervision, Secondary Education, and Elementary Education. Mr. Bolmeier, Mr. Hurlburt, and Mr. Stumpf are advisers to students in School Administration and Supervision; Mr. Petty, Mr. Sublett and Miss Rudisill are advisers in Elementary Education; Mr. Bolmeier, Mr Cartwright, Mr. Githens, and Mr. Shuman are advisers in Secondary Education; and Mr. Colver, Mr. Gehman, and Mr. Weitz are advisers in Guidance and Counseling. Mr. Cartwright and Mr. Hurlburt are advisers for the Master of Arts in Teaching program. Candidates for the Master of Arts, Master of Education, or Master of Arts in Teaching degree should read with special care the regulations of the Graduate School as set forth on pages 34-41.

Candidates for the Master of Arts in the field of guidance should consult the special brochure on guidance available from the Dean of the Graduate School.

It is the intention of the Department to make available to degree candidates all courses ordinarily required for certification as graduate teachers, counselors, principals and superintendents. These courses will normally be offered at least once every three years.

FIRST TERM

118. EDUCATIONAL PSYCHOLOGY.—A study of psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 11:00-12:20. 3 s.h. BALLANTYNE

201. TEACHING AND SUPERVISION OF ARITHMETIC.—Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and graduation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. (June 27-July 15). 11:00-12:20 Monday-Saturday and 2:00-3:20 Monday-Friday. 3 s.h. PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, an analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 9:20-10:40. 3 s.h. STUMPF

227. THE TEACHING OF GEOGRAPHY.—A study of the basic concepts, frame of reference, and curricular materials of geography in the schools. Attention will also be given to desirable methods of presentation. 9:20-10:40. 3 s.h. TUTHILL

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 11:00-12:20. 3 s.h. HURLBURT

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 9:20-10:40. 3 s.h. MISS BRIGGS

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students, through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 7:40-9:00. 3 s.h. COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 9:20-10:40. 3 s.h. COLVER

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. June 10-June 26. 11:00-12:20, Monday through Saturday and 2:00-3:20, Monday through Friday. 3 s.h. REYNOLDS

253. SCHOOL LAW.—The primary purpose of this course is to familiarize school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 7:40-9:00. 3 s.h. BOLMEIER

266. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field

studies. 7:40-9:00 (plus demonstration and laboratory workshops on alternate afternoons, not including Saturdays). 3 s.h. GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 9:20-10:40 (plus demonstration and laboratory workshops on alternate afternoons, not including Saturdays). 3 s.h. GITHENS

315. SEMINAR IN SECONDARY-SCHOOL TEACHING.—Advanced-level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216.

315.1 7:40-9:00. 3 s.h. HURLBURT

315.2 7:40-9:00. 3 s.h. MISS BRIGGS

323. PUBLIC SCHOOL FINANCE.—A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 11:00-12.20. 3 s.h. MR. STUMPF

SECOND TERM

211. THE PROBLEM CHILD (also Psychology 211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. MRS. GEHMAN

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 11:00-12:20. 3 s.h. GEHMAN

222. THE CURRICULUM AND MATERIALS OF THE ELEMENTARY GRADES.—A study of curriculum problems in the elementary schools. 11:00-12:20. 3 s.h. SUBLETT

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 9:20-10:40. 3 s.h. CARTWRIGHT

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 7:40-9:00. 3 s.h. CARTWRIGHT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 7:40-9:00. 3 s.h. BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems guiding the reading of students. 9:20-10:40. 3 s.h. SUBLETT

243. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 7:40-9:00. 3 s.h. GEHMAN

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education, with opportunity for individual research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 11:00-12:20. 3 s.h. WEITZ

## ENGINEERING

PROFESSOR J. L. MERIAM, DEAN OF THE COLLEGE OF ENGINEERING
136 ENGINEERING BUILDING (WEST CAMPUS)

FIRST TERM

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. (Three weeks, eight hours a day.) Instruction begins on June 10 and continues through June 30. 3 s.h. (See Forestry.)
ARGES

C.E. 297. THESIS RESEARCH.—A student with the proper background may carry on research under direction of the staff in one of the following fields: engineering mechanics, foundation engineering, hydraulic engineering, material science, structural engineering, or sanitary engineering. Thesis credit only. 6 units.
MEMBERS OF GRADUATE STAFF IN CIVIL ENGINEERING

E.E. 265. *ADVANCED TOPICS IN ELECTRICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

EE. 297. THESIS RESEARCH.—A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

E.E. 399. *SPECIAL READINGS IN ELECTRICAL ENGINEERING.—Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

M.E. 197. PROJECTS IN MECHANICAL ENGINEERING.—This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h.
STAFF

ME. 297. THESIS RESEARCH.—A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF IN MECHANICAL ENGINEERING

SECOND TERM

C.E. 298. THESIS RESEARCH. (See C.E. 297, First Term.)

E.E. 265.* (Same as First Term.)

E.E. 298. (See E.E. 297, First Term.)

E.E. 399.* (Same as First Term.)

M.E. 198. (See M.E. 197, First Term.)

M.E. 298. (See M.E. 297, First Term.)

## ENGLISH

PROFESSOR ARLIN TURNER, CHAIRMAN—311 ALLEN BUILDING (WEST CAMPUS);
PROFESSOR BENJAMIN BOYCE, DIRECTOR OF GRADUATE STUDIES—
401 ALLEN BUILDING (WEST CAMPUS)

Candidates for the Master's degree in English are expected to have had at least twelve semester hours in undergraduate courses above the sophomore level. The Department may also require additional courses if the work of the student in his first term indicates inadequate preparation.

* Offered only upon sufficient demand; enrollment limited.

FIRST TERM

55. REPRESENTATIVE BRITISH WRITERS.—Chaucer's Prologue to *The Canterbury Tales,* and at least two tales. Shakespeare's *I Henry IV, Hamlet,* or *King Lear,* and one other play, John Donne's poetry (selections), and Milton's *Paradise Lost* (selections) and some of the shorter poems. 7:40-9:00. 3 s.h. JONES

57. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works of Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Emily Dickinson, and Mark Twain. 9:20-10:40. 3 s.h. ANDERSON

203. CHAUCER.—The minor poems, *Troilus,* and *The Canterbury Tales.* 9:20-10:40. 3 s.h. NYGARD

233. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors: Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists. 9:20-10:40. 3 s.h. GOHDES

244. LITERARY BIOGRAPHY.—Selected works from Plutarch to Strachey with discussion of the historical development of biography, the various methods it has used, and the various theories which have been held about it. 7:40-9:00. 3 s.h. SANDERS

261. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative works of leading writers in fiction, drama, and poetry. Shaw, Wells, Yeats, Synge, Conrad, Ford, Forster, Lawrence, and Huxley are included. 11:00-12:20. 3 s.h. SMITH

332. WHITMAN.—A detailed study of *Leaves of Grass* and of selected prose works. 11:00-12:20. 3 s.h. GOHDES

During the first term the Department of English, in conjunction with the North Carolina State Department of Public Instruction, will conduct a Summer Institute for teachers of English in the secondary schools. The courses in the Institute, listed below, are open to teachers selected for the Institute. For fuller information see page 30 of this *Bulletin.*

291. THE STUDY OF LITERATURE.—Analysis of the genres of literature and the application of the basic methods of critical study. Frequent assignments in writing. 9:20-10:40. 3 s.h. SMITH

292. THE STUDY OF LANGUAGE.—A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; usage; and the application of language study to composition. 7:40-9:00. 3 s.h. NYGARD

SECOND TERM

56. REPRESENTATIVE BRITISH WRITERS.—Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 7:40-9:00. 3 s.h. MOORE

58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works of James, Frost or Robinson, Dreiser, O'Neill, Cummings, and Faulkner or Hemingway. 9:20-10:40. 3 s.h. BUDD

222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—The British Romantic poets and prose writers, 1810-1830, with special attention to Byron, Shelley, and Keats. 9:20-10:40. 3 s.h. STEVENSON

223. ENGLISH LITERATURE OF THE LATER NINETEENTH CENTURY.—Some of the most important works of the period with special attention to Carlyle, Dickens, Thackeray, Tennyson, and Browning. 11:00-12:20. 3 s.h. STEVENSON

235. AMERICAN LITERATURE SINCE 1920.—Selected fiction from Sherwood Anderson to the present and the early Imagist school of poets. 7:40-9:00. 3 s.h. DUFFEY

239. SHAKESPEARE.—The plays and poems. 9:20-10:40. 3 s.h. WARD

322. GENRE STUDIES IN TWENTIETH CENTURY AMERICAN LITERATURE.—Formal and thematic problems posed by the fiction, poetry, or drama of this century. 11:00-12:20. 3 s.h. DUFFEY

## FORESTRY

PROFESSOR E. S. HARRAR, DEAN OF THE SCHOOL OF FORESTRY—213 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); PROFESSOR J. G. YOHO, DIRECTOR OF GRADUATE STUDIES—104 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

Organized course work in the School of Forestry during the Summer Session is limited to plane surveying, forest surveying, silvics, and forest mensuration. These courses are required of all students entering upon two years of study in technical forestry leading to the degree of Master of Forestry.

Qualified students may engage in thesis research in certain branches of forestry during the Summer Session with the approval of the instructor concerned and the Dean of the School of Forestry, or of the Director of Graduate Studies in the case of work taken through the Graduate School.

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. (Three weeks, eight hours a day.) Instruction begins on June 10 and continues through June 30. 3 s.h. ARGES

150. FOREST SURVEYING AND AERIAL PHOTO INTERPRETATION.—Application of plane surveying to forest problems; practice in making boundary, topographic and cover type surveys; details of land ownership and transfer, title search, and deed description. The last two weeks are spent in the study of the principles of aerial photogrammetry and photo interpretation, and may be taken separately for two hours of credit. Prerequisites: Civil Engineering 110, Plane Surveying; or equivalent. (Three weeks, eight hours a day.) Instruction begins on July 1 and continues through July 21. 3 s.h. CHAIKEN

151. FOREST MENSURATION.—Field studies in methods of measuring content and growth of trees and forest stands; practice in timber estimating, log scaling, use of mensurational instruments, and collection of basic data. (Three weeks, eight hours a day.) Instruction begins on August 12 and continues through September 1. 3 s.h. OSBORNE

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Instruction begins on July 22 and continues through August 11. (Eight hours daily.) 3 s.h. WOODS

357. RESEARCH IN FORESTRY.—Open to students whose research programs for the M.F. or D.F. degree have been approved by the Dean of the School of Forestry and the instructor responsible for directing the research and whose programs for the A.M. or Ph.D. degree have been approved by the Director of Graduate Studies and the instructor in charge. (Credits and schedule to be arranged.) June 10-August 21. 2 to 12 s.h. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) (Consult courses 301-302 in Announcement of School of Forestry for letter designation of branches of forestry in which research is to be conducted.)

STAFF

## GEOLOGY

PROFESSOR E. WILLARD BERRY, CHAIRMAN—019 SCIENCE BUILDING (EAST CAMPUS)

The class in Geology, Term I, will begin on June 16 and continue through July 15. The class in Geology, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Geology classes will not meet on Saturdays.)

### FIRST TERM

51. GENERAL GEOLOGY.—This course is designed to give a general view of the surface features of the earth, their origin, structure, and materials. Illustrative

materials are studied in the laboratory. Excursions may be made to neighboring points where principles of the science are studied in the field. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. June 16-July 15. 4 s.h. HERON

SECOND TERM

52. GENERAL GEOLOGY.—This course is designed to give some knowledge of the chief events of the earth's history. Excursions may be made to suitable neighboring localities. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. July 17-August 14. 4 s.h. HERON

## GERMAN

PROFESSOR HERMAN SALINGER, CHAIRMAN—301C GRAY BUILDING (WEST CAMPUS)

The work in German 2, 63 and 64 will be coordinated with listening and oral practice in the language laboratory which students in German classes will be privileged to attend. Attendance in the laboratory is not compulsory but is very strongly advised by the Staff.

FIRST TERM

2. ELEMENTARY GERMAN.—Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. Prerequisite: German 1 or equivalent. 11:00-12:20; and on Tuesdays and Fridays, 2:00-3:20. 4 s.h. SEYMOUR

63. INTERMEDIATE GERMAN.—Grammar review and composition; reading of short stories, novels, and poems. Prerequisite: German 1-2, or two units of high school German. 9:20-10:40. 3 s.h. ALT

64. INTERMEDIATE GERMAN.—Continuation of German 63. Prerequisite: German 63 which may be taken concurrently. 11:00-12:20. 3 s.h. ALT

GRADUATE READING COURSE.—An intensive course in German to develop rapidly the ability to read technical German in several fields. For graduate students only. 9:20-10:40. No degree credit. SEYMOUR

## GREEK

(See Classical Studies)

## HEALTH AND PHYSICAL EDUCATION

E. M. CAMERON, DIRECTOR, TRINITY COLLEGE AND COLLEGE OF ENGINEERING—109 GYMNASIUM (WEST CAMPUS)

FIRST TERM

PE 182. THE ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION IN SECONDARY SCHOOLS.—Presents the everyday problems that arise in the experience of the teacher of health and physical education. Open to juniors and seniors. 11:00-12:20. 3 s.h. HARRISON

PE 190. PROTECTIVE PRACTICES IN PHYSICAL EDUCATION.—Training and conditioning of athletic teams and the prevention, diagnosis, and treatment of athletic injuries. Gymnasium. 7:40-9:00. 3 s.h. CHAMBERS

## HINDUSTANI

FIRST TERM

181. INTENSIVE ELEMENTARY HINDUSTANI.—Concentration on the acquisition of conversational ability in Hindustani, with a grammar and vocabulary basic to both Hindi and Urdu. Introduction to the Devanagari script, and the reading of graded texts. 7:40-9:00; and on Mondays and Thursdays, 2:00-32:20. 4 s.h. SWAN

183. INTENSIVE INTERMEDIATE HINDUSTANI.—Four hours of classroom work, two hours of language drill. Advanced conversation in Hindustani. Reading

and Composition. Introduction to the Nastaliq script. (Prerequisite: Elementary Hindustani.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h.
SWAN AND SALVÉ

SECOND TERM

182. INTENSIVE ELEMENTARY HINDUSTANI.—(See description for 181.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h. SWAN

184. INTENSIVE INTERMEDIATE HINDUSTANI.—(See description for 183.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h. SWAN AND SALVÉ

## HISTORY

PROFESSOR RICHARD L. WATSON, JR., CHAIRMAN—235 ALLEN BUILDING (WEST CAMPUS);
PROFESSOR HAROLD T. PARKER, DIRECTOR OF GRADUATE STUDIES—
232 ALLEN BUILDING (WEST CAMPUS)

For admission to candidacy for a Master's degree in History, the student must present a total of twelve semester hours of prior work in History, of which at least six must be in American History if he plans to take his major work in that field. Candidates for the degrees of Master of Arts in Teaching are required to complete at least three hours of seminar work and are strongly urged to enroll for this work in the second term of their attendance in the Summer Session. (See courses numbered 300 or above.)

FIRST TERM

51. MODERN HISTORY, 1500-1851.—The central fact of the expansion of Europe underlies the content of the course. The chief themes are: the contest between liberty and authority in the modern state, changing economic theory and organization, and the problems of peace and war among the states, including the Western infiltration of Asia, Latin America, and Africa, and the rise of the United States as a world power. 7:40-9:00. 3 s.h. HOFFMANN

91. THE DEVELOPMENT OF AMERICAN DEMOCRACY TO 1865.—This course is a study of trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social behavior, and conflicting ideals are considered in relation to this main theme. 7:40-9:00. 3 s.h. KUEHL

141. MODERNIZATION IN CHINA AND JAPAN.—A history of the response of China and Japan to the West between 1750 and 1911, with some attention to their cultural background. 9:20-10:40. 3 s.h. GILLIN

216. THE DIPLOMATIC HISTORY OF THE UNITED STATES, 1898 TO THE PRESENT.—The emphasis is on the emergence of the United States to world power and leadership, and on those factors which have shaped its foreign policies. 9:20-10:40. 3 s.h. KUEHL

252. RECENT EUROPEAN HISTORY: EUROPE BETWEEN THE WARS, 1919-1939.—Totalitarianism in Russia, Italy, and Germany; liberal France and England in difficulties; the disintegration of the peace. 11:00-12:20. 3 s.h. HOFFMANN

289. NATIONALISM AND COMMUNISM IN MODERN CHINA AND JAPAN.—The growth of Nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 7:40-9:00. 3 s.h. GILLIN

301. SEMINAR IN HISTORICAL INVESTIGATION.—A course designed to introduce teachers, current and prospective, to the processes of historical research through investigation of particular instances. The topics selected for investigation vary with the needs and interests of each individual. 1:40-3:00 or at an hour to be arranged. 3 s.h. FERGUSON

SECOND TERM

52. MODERN HISTORY, 1851-1964.—A continuation of History 51. 7:40-9:00. 3 s.h. CELL

92. THE DEVELOPMENT OF AMERICAN DEMOCRACY, 1865 TO THE

PRESENT.—The emphasis is on the emergence of contemporary problems. 7:40-9:00. 3 s.h. BATES

162. HISTORY OF RUSSIA, 1917 TO THE PRESENT.—The history and policies of the Soviet state since the Revolution of 1917. 9:20-10:40. 3 s.h. LERNER

206. THE UNITED STATES IN THE 20TH CENTURY: SINCE WORLD WAR I. 9:20-10:40. 3 s.h. BATES

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 7:40-9:00. 3 s.h. ROPP

239. HISTORY OF INTERNATIONAL COMMUNISM.—The history of the international socialist and communist movement from pre-Marxist days to the present. 11:00-12:20. 3 s.h. LERNER

302. SEMINAR IN HISTORICAL INVESTIGATION.—See description of 301. 1:40-3:00 or at an hour to be arranged. 3 s.h. ROPP

## HOSPITAL ADMINISTRATION

### SECOND TERM

201. HISTORY AND DEVELOPMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions; analysis of medical care organizations in the United States, and an introduction to the medical sciences and to medical terminology. 3 s.h. SMITH

## MATHEMATICS

PROFESSOR J. J. GERGEN, CHAIRMAN—134 PHYSICS BUILDING (WEST CAMPUS); ASSOCIATE PROFESSOR S. L. WARNER, DIRECTOR OF GRADUATE STUDIES—223 PHYSICS BUILDING (WEST CAMPUS)

Graduate students are invited to consult with the Director of Graduate Studies concerning their programs.

### FIRST TERM

21. INTRODUCTORY CALCULUS.—Rectangular coordinates, functions, graphs, derivatives, maxima and minima, indefinite integrals, areas. Prerequisite: two and one-half units of college preparatory mathematics. 9:20-10:40. 3 s.h. SMITH

64. INTERMEDIATE CALCULUS.—Infinite series, vectors, and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 63. NOTE: This is a three-week course beginning June 10. 7:40-9:00 and 11:00-12:20. 3 s.h. SCOVILLE

213. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations. 11:00-12:20. 3 s.h. SMITH

259. SOLID ANALYTIC GEOMETRY.—Spacial and n-dimensional coordinate geometry. Configuration of planes and lines, quadric surfaces, algebraic curves. 9:20-10:40. 3 s.h. STACKELBERG

### SECOND TERM

22. INTRODUCTORY CALCULUS.—Application of the definite integral to distance, volume, length, area of surface of revolution moments, centroids, work; trigonometric, logarithmic and exponential functions; methods of integration. Prerequisite: Mathematics 21. 9:20-10:40. 3 s.h. BRYSON

## MATHEMATICS AND SCIENCE INSTITUTE

Only persons who are regular participants in the Summer Science and Mathematics Institute are eligible for these courses, except by special permission from the Director of the Institute.

Botany 206. BOTANY FOR TEACHERS. 3 units (graduate).

Botany 235. INTRODUCTION TO FIELD BOTANY. 3 units (graduate).

Botany 236. FIELD BOTANY. 3 units (graduate).

Chemistry NSF 1. INORGANIC CHEMISTRY WITH REFRESHER MATHEMATICS. 3 units (undergrad.).

Chemistry 211-212. CHEMISTRY FOR TEACHERS. 6 units (graduate).

Mathematics 21-22. INTRODUCTORY CALCULUS. 6 units (undergrad.).

Mathematics 63. INTERMEDIATE CALCULUS. 3 units (undergrad.).

Mathematics 215. INTERMEDIATE ANALYSIS. 3 units (graduate).

Mathematics 211. FINITE MATHEMATICS. 3 units (graduate).

Mathematics 209. FUNDAMENTAL CONCEPTS IN ALGEBRA, ANALYSIS, AND GEOMETRY. 3 units (graduate).

Physics 231-232. PHYSICS FOR TEACHERS. 6 units (graduate).

Zoology 205. ZOOLOGY FOR TEACHERS. 3 units (graduate).

Zoology 225. INTRODUCTION TO FIELD ZOOLOGY. 3 units (graduate).

Zoology 226. FIELD ZOOLOGY. 3 units (graduate).

(These courses provide work for three groups in biology, one group in chemistry, two groups in mathematics, and one group in physics.)

## NURSING

These courses are open to nurses only, except by special permission from the Dean of the School of Nursing.

N120. PEDIATRIC NURSING.

N130. OBSTETRIC NURSING.

N140. MEDICAL NURSING.

N150. SURGICAL NURSING.

N180. PUBLIC HEALTH SCIENCES.

## PHILOSOPHY

PROFESSOR CHARLES A. BAYLIS, CHAIRMAN—212 WEST DUKE BUILDING (EAST CAMPUS); PROFESSOR PAUL WELSH, DIRECTOR OF GRADUATE STUDIES—212 WEST DUKE BUILDING (EAST CAMPUS)

### FIRST TERM

91. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 91 is concerned with (a) the nature of truth and fact, evidence, faith and knowledge; (b) the nature of the fundamental categories ultimately descriptive of the universe. 9:20-10:40. 3 s.h. PEACH

94. HISTORY OF PHILOSOPHY: ANCIENT AND MODERN.—An introduction to philosophy through the study of some of the major writings of the modern philosophers through Kant. 11:00-12:20. 3 s.h. PEACH

### SECOND TERM

91. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 91 is concerned with (a) the nature of truth and fact, evidence, faith and knowledge; (b) the nature of the fundamental categories ultimately descriptive of the universe. 9:20-10:40. 3 s.h. WELSH

92. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 92 is concerned with the nature and ground of values, ultimate goals and moral obligation. 11:00-12:20. 3 s.h. WELSH

## PHYSICS

PROFESSOR HENRY A. FAIRBANK, CHAIRMAN—119 PHYSICS BUILDING (WEST CAMPUS)

Classes in Physics 41, Term I, will begin on June 16 and continue through July 15. Classes in Physics 42, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Physics classes will not meet on Saturdays.)

### FIRST TERM

41. GENERAL PHYSICS.—This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. Prerequisites: Mathematics 21, 22 or equivalent. 4 s.h. HOPKINS AND CARPENTER

353X. THESIS SEMINAR.—Students who are properly qualified may carry on research work under direction. Credits and hours to be arranged. STAFF

### SECOND TERM

42. GENERAL PHYSICS.—A continuation of Physics 41. Prerequisite: Physics 41. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. 4 s.h. HOPKINS AND CARPENTER

## POLITICAL SCIENCE

PROFESSOR ROBERT S. RANKIN, CHAIRMAN—308 LIBRARY (WEST CAMPUS);
PROFESSOR ROBERT R. WILSON, DIRECTOR OF GRADUATE STUDIES—
405 LIBRARY (WEST CAMPUS)

### FIRST TERM

61. THE AMERICAN POLITICAL SYSTEM.—An analysis of the principles and institutions of government and politics in the United States. 11:00-12:20. 3 s.h. KEARNEY

109. STATE AND LOCAL GOVERNMENT TODAY.—Problems in state, county and city government including the administration of government services such as education, public welfare, law enforcement; intergovernmental relationships; administrative reorganization; methods of popular control; and the reconstruction of state and local government so as to meet present-day needs. 7:40-9:00. 3 s.h. LEACH

183. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHEAST ASIA.—An analysis of the development of government in Thailand, Vietnam, Burma, Malaya, Indonesia, Ceylon and the Philippines. Attention will be given to the Islamic, Buddhist and other indigenous cultures of these nations. (This course is a part of the Special Hindi-Urdu Program.) 9:20-10:40. 3 s.h. KEARNEY

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 9:20-10:40. 3 s.h. LEACH

### SECOND TERM

62. COMPARATIVE POLITICAL SYSTEMS.—An analysis of the principles and institutions of selected foreign governments, as compared with those of the United States. 11:00-12:20. 3 s.h. MRS. CHEEK

190. CAREER PROBLEMS IN GOVERNMENT.—Principles, techniques, and problems of public service; recent approaches to the teaching of American government and to public personnel practices.

*It is designed especially for students planning to teach or to enter the government career service.* 9:20-10:40. 3 s.h. MRS. CHEEK

## PSYCHOLOGY

PROFESSOR KARL ZENER, CHAIRMAN—224 BUILDING 9; PROFESSOR NORMAN GUTTMAN, DIRECTOR OF GRADUATE STUDIES—103 BUILDING 9

Details concerning the program in studies in Psychology may be obtained from the Director of Graduate Studies in Psychology.

### FIRST TERM

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of normal adult psychology through a study of psychological methods as applied to motivation, emotions, perception, sensation, thinking, memory, learning, individual differences, and personality.

91.1 7:40-9:00. 3 s.h. WALLER

91.2 9:20-10:40. 3 s.h. WALLER

91.3 9:20-10:40. 3 s.h. MRS. HUSE

232. PERSONALITY AND PHYSICAL HANDICAP.—Survey of the psychological factors underlying adjustment to physical disabilities, with particular stress upon personality, emotional and social attributes. Selected case studies will be used to illustrate the integration of such factors in adjusting to home, school, and hospital settings. These cases will stress the psychological factors which hinder learning and retraining procedures. Discussion will center about psychological techniques to produce more effective progress in rehabilitation. 7:40-9:00. 3 s.h. MRS. HUSE

303. RESEARCH.—Students who are properly qualified may carry on research work under direction. Hours and credit to be arranged. STAFF

### SECOND TERM

100. PERSONALITY AND SOCIAL BEHAVIOR.—A survey of basic psychological principles underlying the study of personality in relation to the social environment. Among the topics discussed are theories of personality, the process of socialization of the individual, factors influencing adjustment to the social environment, the interaction of culture and personality. 9:20-10:40. 3 s.h. CARSON

211. THE PROBLEM CHILD (Also Education 211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. MRS. GEHMAN

304. RESEARCH.—Students who are properly qualified may carry on research work under direction. Hours and credit to be arranged. STAFF

## RELIGION

PROFESSOR ROBERT E. CUSHMAN, DEAN OF THE DIVINITY SCHOOL—110 DIVINITY SCHOOL (WEST CAMPUS); PROFESSOR JAMES L. PRICE, CHAIRMAN OF THE DEPARTMENT OF RELIGION—107 GRAY (WEST CAMPUS); ASSISTANT PROFESSOR W. D. WHITE, DIRECTOR OF UNDERGRADUATE STUDIES IN RELIGION—104 GRAY (WEST CAMPUS); PROFESSOR WALDO BEACH, DIRECTOR OF GRADUATE STUDIES IN RELIGION —308 DIVINITY SCHOOL (WEST CAMPUS)

## THE DEPARTMENT OF RELIGION

### FIRST TERM

51. THE ENGLISH BIBLE.—A survey of the Old Testament, similar to Religion 1 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1. 7:40-9:00. 3 s.h. OSBORN

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal per-

sons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 7:40-9:00. 3 s.h. BRADLEY

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. 9:20-10:40. 3 s.h. BRADLEY

140. CHRISTIAN BELIEFS.—An introductory study of important Christian teachings concerning God, Jesus Christ, sin and salvation, etc., intended to serve as a basis for the student's evaluation of his own religious concepts. 9:20-10:40. 3 s.h. LANGFORD

149. CURRENT INTERPRETATIONS OF CHRISTIANITY.—Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 11:00-12:20. 3 s.h. OSBORN

SECOND TERM

52. THE ENGLISH BIBLE.—A survey of the New Testament, similar to Religion 2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 2. 9:20-10:40. 3 s.h. WHITE

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 7:40-9:00. 3 s.h. DANIELS

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to His contemporary significance. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. 9:20-10:40. 3 s.h. DANIELS

187. RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE.—A consideration of the religious insights, explicit and implied, in representative writings. 7:40-9:00. 3 s.h. WHITE

## THE DIVINITY SCHOOL

Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.

FIRST TERM

110 (DS). THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 11:00-12:20. 3 s.h. ROBINSON

120 (DS). FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles, the Nicene and the Chalcedonian Creeds in their contemporary setting. 7:40-9:00. 3 s.h. GRISLIS

337 (DS). THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 9:20-10:40. 3 s.h. HILLERBRAND

SECOND TERM

105 (DS). STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and Epistles with attention to Paul's theology as reflected in selected passages. 7:40-9:00. 3 s.h. EFIRD

153 (DS). PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of

the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 9:20-10:40. 3 s.h. INGRAM

190 (DS). THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 11:00-12:20. 3 s.h. LACY

## ROMANCE LANGUAGES

PROFESSOR GIFFORD DAVIS, CHAIRMAN—205 BUILDING 5; PROFESSOR C. C. CHERPACK, DIRECTOR OF GRADUATE STUDIES—310 BUILDING 5

### FRENCH

#### FIRST TERM

1. ELEMENTARY FRENCH.—Introduction to understanding, speaking, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. BRYAN

63. INTERMEDIATE FRENCH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or two years of high-school French. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. TÉTEL

97. SPOKEN FRENCH.—Intensive instruction in the spoken language: contemporary French prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: French 64. 11:00-12:20. 3 s.h. MRS. BRYAN

#### SECOND TERM

2. ELEMENTARY FRENCH.—Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. GOODE

64. INTERMEDIATE FRENCH.—Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. BUSH

211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 9:20-10:40. 3 s.h. CHERPACK

218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 7:40-9:00. 3 s.h. DOW

### SPANISH

#### FIRST TERM

1. ELEMENTARY SPANISH.—Introduction to understanding, speaking, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. WINECOFF

63. INTERMEDIATE SPANISH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or two years of high-school Spanish. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. TORRE

#### SECOND TERM

2. ELEMENTARY SPANISH.—Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. GLENN

64. INTERMEDIATE SPANISH.—Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. DANIEL

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR EDGAR T. THOMPSON, ACTING CHAIRMAN—275 BUILDING 9 (WEST CAMPUS); PROFESSOR ALAN C. KERCKHOFF, DIRECTOR OF GRADUATE STUDIES—271 BUILDING 9

The Department of Sociology offers graduate work leading to the A.M. and Ph.D. degrees. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. A student who is deficient in the minimum required work will be asked to take additional undergraduate courses agreed upon in conference with the Director of Graduate Studies.

Candidates for advanced degrees in Sociology usually take minor work in Psychology, Economics, Political Science, Education, History, or Religion. Detailed requirements for the minor work, and for majors in other departments who wish to present Sociology as minor work, may be obtained from the Director of Graduate Studies.

### FIRST TERM

91. INTRODUCTION TO SOCIOLOGY: CONCEPTS AND PROCEDURES.—Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. Open to freshmen. 11:00-12:20. 3 s.h. MRS. WHITRIDGE

154. THE SOCIOLOGY OF THE ARTS.—An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations and art works as they function in their social-cultural milieux. 9:20-10:40. 3 s.h. MRS. WHITRIDGE

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 9:20-10:40. 3 s.h. THOMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 11:00-12:20. 3 s.h. THOMPSON

### SECOND TERM

92. INTRODUCTION TO SOCIOLOGY: SOCIOLOGICAL STUDIES.—Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 11:00-12:20. 3 s.h. ROY

230. SOCIETY AND CULTURE IN INDIA.—The basic features of Indian culture and the impact of selected technological and social changes. (This course is a part of the Special Hindi-Urdu Program.) 11:00-12:20. 3 s.h. ROWE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 9:20-10:40. 3 s.h. ROY

## ZOOLOGY

PROFESSOR EDWARD C. HORN, CHAIRMAN—227 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); ASSOCIATE PROFESSOR H. S. ROBERTS, ACTING DIRECTOR OF GRADUATE STUDIES—044 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

All classes in Zoology are offered at the Duke University Marine Laboratory at Beaufort, North Carolina (Term I, June 10-July 15; Term II, July 16-August 21). Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* pages 20-23 of this *Bulletin*. For detailed instructions and further information on these offerings see the *Bulletin of Duke University Marine Laboratory*.

To undertake study toward an advanced degree in Zoology, a student should have completed an undergraduate major in Zoology or its equivalent. This normally amounts to twenty-four or more hours of course work distributed among various fields of Zoology. The department recognizes the trend in modern biology towards interdisciplinary research, and part of the Zoology requirements may be replaced by advanced work in Chemistry, Mathematics, Physics, etc.

Required work for the A.M. degree ordinarily includes twelve units of advanced course work in Zoology, six units of course work in a minor department, and an additional six units of advanced course work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of Zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and dissertation based on original work. Minor work is available in many fields, including Anatomy, Biochemistry, Botany, Chemistry, Physics, Physiology and Psychology.

FIRST TERM (Duke Campus)

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

FIRST TERM (Duke Marine Laboratory)

203. MARINE ECOLOGY.—A study of marine animals in relation to environment. Consideration of environmental factors, succession, rhythms, communities, intraspecific and interspecific relations, productivity, conservation problems, etc., concerned with animal life in the ocean. Lectures, reviews, conferences, field and laboratory work. 6 s.h. GRAY

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. VERNBERG

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

SECOND TERM (Duke Campus)

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

SECOND TERM (Duke Marine Laboratory)

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 6 s.h. MENZIES

274. MARINE INVERTEBRATE ZOOLOGY.—A study of invertebrate animals that occur in the Beaufort region. A number of field trips will be made to a variety of habitats to study, collect, and classify animals in their natural environment. The structure and habits of living invertebrates, as well as their behavior under certain experimental conditions, will be studied in the laboratory. 6 s.h. BOOKHOUT

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

Housing Bureau, Duke Station, Durham, North Carolina.

Room assignment will be made only upon the applicant's admission to the Summer Session, as certified by the Summer Session Office, and upon payment of full room rent. Applicants who expect to be in residence for longer than one term of the Summer Session are urged to make advance reservation for the entire period and thus avoid, to the extent that housing arrangements make it practicable, the necessity of moving from one room to another during the full term of residence.

See page 18 of Summer Session *Bulletin* for information concerning refunds of housing fees.

Persons requesting a single room will be assigned a double room occupied by one person, if no single rooms are available. Persons assigned a double room occupied by one person will be charged room rent as stated on page 17.

Requests for specific roommates will be complied with, provided completed application forms of both applicants indicate mutual agreement and are on hand in the Housing Bureau at the time of room assignment. If the applicant requests a double room but gives no preference of roommate, Bureau officials will try to assign a roommate of seemingly congenial interests. It is understood, however, that the responsibility for getting and keeping a roommate rests with the applicant, otherwise it will be necessary for him to move to a single room or to make the indicated financial adjustment.

☐ Male ☐ Graduate

Name..... ☐ Female ☐ Undergraduate

(Last) (First) (Middle)

Present address..... Permanent address.....

(Address to which mail always will be forwarded)

Present position..... Address.....

If you are in college now, give name of institution and your class:.....

.....

Will you be writing a thesis this summer? Yes..... No.....

Date of your expected arrival at Duke for the Summer Session.....

Date of your expected arrival at Beaufort for the Summer Session.....

Number of weeks you expect to remain..... Type of room desired: Single..... Double.....

Name of roommate preferred, if any.....

Address.....

## DIRECTIONS TO SUMMER SESSION APPLICANTS

All applicants for Summer Session courses who are not now in residence at Duke University must fill out accurately and in detail the form below and return it to the Director of the Summer Session. Preference in enrollment will be given to persons returning the form promptly, but a place in a particular course cannot be assured until all fees are paid. Undergraduates or graduates who are enrolled in a university or college other than Duke University and who are seeking to transfer summer session credits to the college in which they are matriculated should request a course approval form to be certified by their dean or registrar. Persons applying for admission to the Graduate School of Duke University should write the Dean of the Graduate School for the necessary forms in addition to completing the form below.

.....

No. Approved Date.....

## APPLICATION FOR ENROLLMENT IN THE DUKE UNIVERSITY SUMMER SESSION

Mr., Mrs., Miss.....

(Please Print)

Street Address, Rural Route, or P. O. Box.....

Post Office..... State.....

Nationality.....

Please register me in the following courses listed in the Summer Session *Bulletin*.

| Department | No. of Course | Title of Course |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

Name and address of High School from which you graduated.....

.....

Have you attended a college? Yes..... No.....

Name and address of college.....

Highest degree held.....

Are you a candidate for a degree? Yes..... No.....

If yes, for which degree?.....

In what school or college of Duke University are you seeking to enro (check one):

| *Undergraduate* credits | *Graduate* credits |
|---|---|
| ☐ Trinity College (men) | ☐ Graduate School, Arts and Sciences |
| ☐ The Woman's College | ☐ Divinity School |
| ☐ College of Engineering | ☐ School of Forestry |
| ☐ Special or unclassified | ☐ Special or unclassified |
| ☐ Credits for transfer | ☐ Credits for transfer |

Have you applied for admission to the Graduate School?.....

Are you at present a college student?..... If so, where?.....

.....What class?.....

Are you a full-time teacher?.....

Name and address of school.....

Teaching position.....

Total number years teaching experience.....

Will your fees be paid by:

(a) Yourself.....

(b) Veterans' Administration, Public Law 346 or 16.....

(c) Funds received under Public Law 550.....

Have you attended previous Summer Sessions at Duke: Yes.....

Years..... No.....

BULLETIN
OF
DUKE UNIVERSITY

# The School of Forestry

ANNOUNCEMENTS FOR 1964-65

VOLUME 36 February, 1964 NUMBER 4-A

# Annual Bulletins

FOR BULLETIN OF INFORMATION FOR PROSPECTIVE STUDENTS, apply to *The Registrar,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF UNDERGRADUATE INSTRUCTION, apply to *The Registrar,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE COLLEGE OF ENGINEERING, apply to *The Registrar,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE DIVINITY SCHOOL, apply to *The Dean of the Divinity School,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE SCHOOL OF FORESTRY, apply to *The Dean of the School of Forestry,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE GRADUATE SCHOOL OF ARTS AND SCIENCES, apply to *The Dean of the Graduate School,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE SCHOOL OF LAW, apply to *The Dean of the School of Law,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE SCHOOL OF MEDICINE, apply to *The Dean of the School of Medicine,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE SCHOOL OF NURSING, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C., 27706

FOR BULLETIN OF THE SUMMER SESSION, apply to *The Director of the Summer Session,* Duke University, Durham, N. C., 27706

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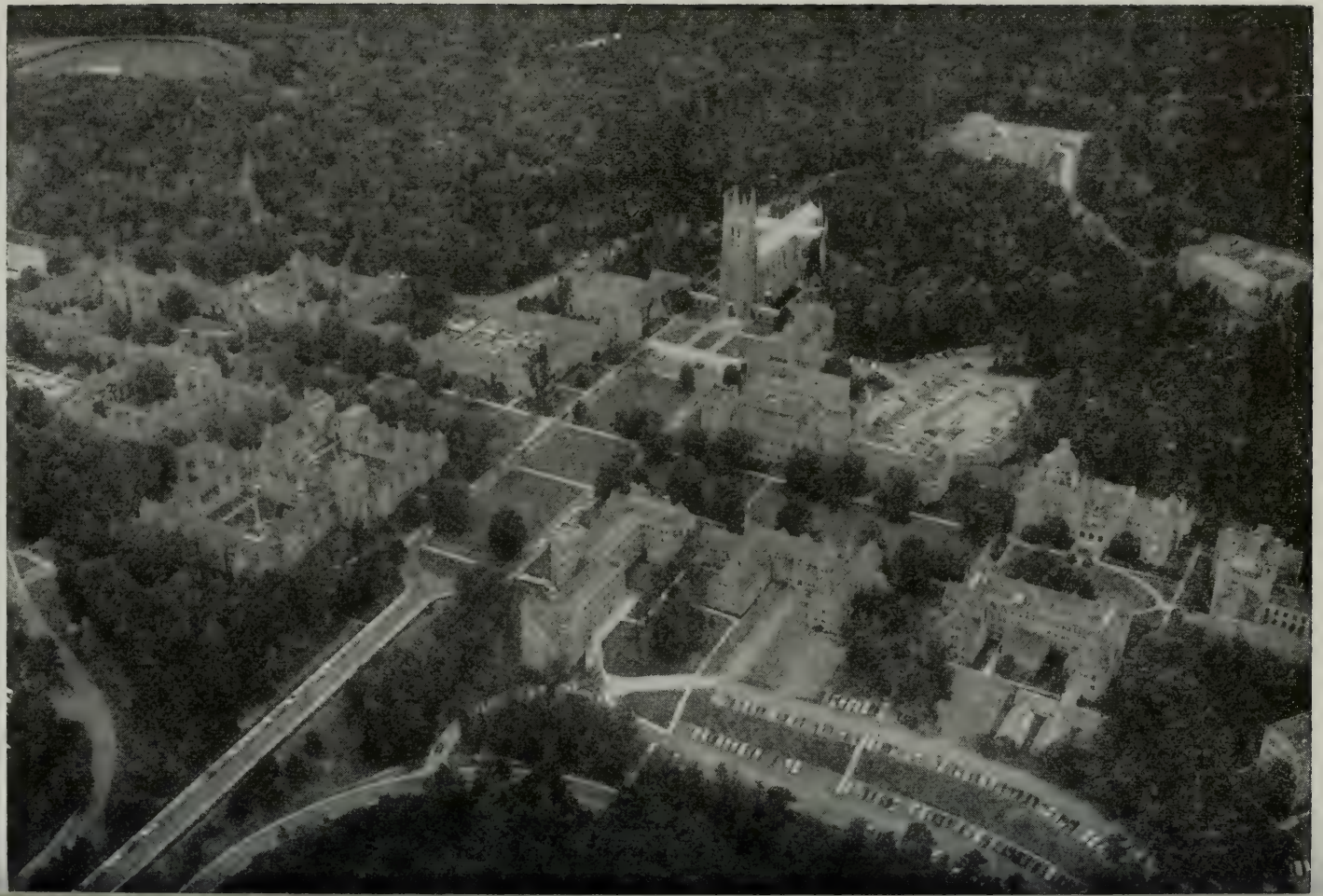
# BULLETIN
OF
# DUKE UNIVERSITY

## THE SCHOOL OF FORESTRY




## ANNOUNCEMENTS FOR 1964-65

DURHAM, NORTH CAROLINA
1964



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# School of Forestry Calendar



1964

| | | |
|---|---|---|
| June | 9 | Tuesday—Registration of students for summer work in forestry. |
| June | 10 | Wednesday—Field work in Plane Surveying (C.E. 110) begins. |
| July | 1 | Wednesday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., 114 Physics. Candidates register in the Graduate School Office not later than June 25. |
| July | 1 | Wednesday—Field work in Forest Surveying and Aerial Photo Interpretation (For. 150) begins. |
| July | 6-10 | German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than June 25. |
| July | 22 | Wednesday—Field work in Silvics (For. 243) begins. |
| August | 12 | Wednesday—Field work in Forest Mensuration (For. 151) begins. |
| September | 21 | Monday—Reading, Vocabulary and Grammar Tests in French, Spanish and German; French and Spanish 9:00 A.M., German, 10:15 A.M., all in 125 Engineering Building. |
| September | 21 | Monday—English Tests for Foreign Students. 2:00 P.M., 125 Engineering Building. |
| September | 21-22 | Conference period for new students entering the doctorate program. |
| September | 22 | Tuesday—Registration of students in the School of Forestry. |
| September | 24 | Thursday—Instruction begins in the School of Forestry. |
| September | 28 | Monday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., Room 125 Engineering Building. Candidates register in the Graduate School Office for these examinations not later than September 2. |
| October | 12-16 | German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than October 2. |
| November | 25 | Wednesday, 12:30 P.M.—Thanksgiving recess begins. |
| November | 30 | Monday, 8:00 A.M.—Instruction is resumed. |
| December | 11 | Friday—Founders' Day. |
| December | 19 | Friday, 12:30 P.M.—Christmas recess begins. |

1965

| | | |
|---|---|---|
| January | 4 | Monday, 8:00 A.M.—Instruction is resumed. |
| January | 8 | Friday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., place to be announced. Candidates register in the Graduate School Office for these examinations not later than December 19, 1964. |
| January | 19 | Tuesday—School of Forestry mid-year examinations begin. |
| January | 29 | Friday—School of Forestry mid-year examinations end. |

| | | |
|---|---|---|
| February | 1 | Monday—Reading, Vocabulary and Grammar Tests in French, Spanish and German for entering students, second semester. French and Spanish 10:30 A.M., German, 11:45 A.M., both in 125 Engineering Building. |
| February | 2 | Tuesday—Registration of new students in the School of Forestry. |
| February | 4 | Thursday—Second semester begins. |
| March | 27 | Saturday, 12:30 P.M.—Spring recess begins, School of Forestry Coastal Plain field work begins. |
| April | 5 | Monday, 8:00 A.M.—Instruction is resumed. |
| April | 9 | Friday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., place to be announced. Candidates register in the Graduate School Office for these examinations not later than March 26. |
| April | 10 | Saturday, 8:00 A.M.—Coastal Plain field work ends. |
| April | 15 | Thursday—Last day for submitting Doctor of Forestry dissertations. |
| May | 3-7 | German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than April 23. |
| May | 15 | Saturday—Last day for submitting Master of Forestry theses. |
| May | 20 | Thursday, 5:00 P.M.—Second semester classes end. |
| May | 22 | Saturday—Final examinations begin. |
| June | 2 | Wednesday—Final examinations end. |
| June | 5 | Saturday—Commencement begins. |
| June | 6 | Sunday—Commencement sermon. |
| June | 7 | Monday—Commencement Address and Graduating Exercises. |

# Officers of the University for the Year 1964-65

## *General Administration*

Douglas Maitland Knight, *Ph.D., President of the University*
Robert Taylor Cole, *Ph.D., Provost*
Gerhard Chester Henricksen, *M.A., C.P.A., Vice President for Business and Finance, Treasurer*
Everett Harold Hopkins, *LL.D., Vice President for University Planning and Institutional Studies*
Frank Leon Ashmore, *A.B., Vice President for Institutional Advancement*
Charles Edward Jordan, *LL.D., Vice President for University Relations*
Herbert James Herring, *LL.D., Vice President for Student Life*
Harold Walter Lewis, *Ph.D., Dean of Arts and Sciences, Vice Provost*
Frank Traver deVyver, *Ph.D., Vice Provost*
Barnes Woodhall, *M.D., Vice Provost*
Benjamin Edward Powell, *Ph.D., Librarian*
Richard Lovejoy Tuthill, *Ed.D., University Registrar*
Craufurd David Goodwin, *Ph.D., Secretary*
Edwin Constant Bryson, *LL.B., University Counsel*

## *School of Forestry Administration*

| | |
|---|---|
| Ellwood Scott Harrar, *M.S., Ph.D., Sc.D.*<br>*Dean of the School of Forestry* | 2228 Cranford Road |
| Fred Myerle White, *M.F.*<br>*Assistant to the Dean and Director of the Spring Camp* | Box 4144 Duke Station |
| Leon Edward Chaiken, *M.F.*<br>*Director, Duke Forest* | 2737 Dogwood Road |
| James Gibson Yoho, *M.F., Ph.D.*<br>*Director of Graduate Studies in the Department of Forestry of the Graduate School* | 2522 Sevier Street |

COMMITTEE OF THE BOARD OF TRUSTEES ON THE SCHOOL OF FORESTRY

N. E. Edgerton, B. F. Few, J. E. Von Canon, J. R. Smith

CHAIRMEN, FACULTY COMMITTEES

Admissions: L. E. Chaiken
Alumni Relations and Student Affairs: F. M. White
Library: K. R. Knoerr
Publications: E. S. Harrar
Scholarships and Fellowships: C. W. Ralston

# Faculty



| | |
|---|---|
| Roger Fabian Anderson (1951), *M.S., Ph.D.*<br>*Professor of Forest Entomology* | 2528 Perkins Road |
| Leon Edward Chaiken (1952), *M.F.*<br>*Professor of Forest Management* | 2737 Dogwood Road |
| Ellwood Scott Harrar (1936), *M.S., Ph.D., Sc.D.*<br>*Professor of Wood Technology* | 2228 Cranford Road |
| Kenneth Richard Knoerr (1961), *M.F., Ph.D.*<br>*Assistant Professor of Forest Climatology* | 4429 Ryan Street |
| Paul Jackson Kramer (1931), *M.Sc., Ph.D.*<br>*James B. Duke Professor of Botany* | 2251 Cranford Road |
| James Granville Osborne (1961), *B.S.*<br>*Professor of Forest Biometry* | 2756 McDowell Street |
| Charles William Ralston (1953), *M.F., Ph.D.*<br>*Associate Professor of Forest Soils* | 2531 Wrightwood Avenue |
| William James Stambaugh (1961), *M.S., Ph.D.*<br>*Assistant Professor of Forest Pathology* | 3211 Sherbon Drive |
| John Dennis Sullivan (1959), *M.S., Ph.D.*<br>*Assistant Professor of Wood Technology* | 2710 McDowell Street |
| Albert Edward Wackerman (1938), *M.F.*<br>*Professor of Forest Utilization* | 3610 Dover Road, Hope Valley |
| Fred Myerle White (1959), *M.F.*<br>*Assistant Professor of Forestry* | Box 4144, Duke Station |
| Frank Wilson Woods (1958), *M.S., Ph.D.*<br>*Assistant Professor of Silviculture* | 1509 Pinecrest Road |
| James Gibson Yoho (1957), *M.F., Ph.D.*<br>*Professor of Forest Economics* | 2522 Sevier Street |

## *Faculty Emeriti*

| | |
|---|---|
| Clarence Ferdinand Korstian, *M.F., Ph.D.*<br>*Professor Emeritus of Silviculture* | 4 Sylvan Road |
| Francis Xavier Schumacher, *B.S., D.Sc.*<br>*Professor Emeritus of Forestry* | Pope Road, Route 3 |
| Frederick Adolphus Wolf, *Ph.D.*<br>*James B. Duke Professor Emeritus of Botany* | 924 Urban Avenue |

## *Adjunct Faculty*

FOREST SCIENCES LABORATORY
OF THE
SOUTHEASTERN FOREST EXPERIMENT STATION

| | |
|---|---|
| Robert Lloyd Barnes, *M.F., Ph.D.*<br>*Adjunct Associate Professor of Forest Physiology* | 1015 Gloria Avenue |
| Edgar William Clark, *Ph.D.*<br>*Adjunct Associate Professor of*<br>*Forest Entomology* | Route 1, Box 474, Cary, N. C. |

| | |
|---|---|
| Charles Sasnette Hodges, Jr., *M.F., Ph.D.*<br>*Adjunct Associate Professor of Forest Pathology* | 505 Pleasants Avenue, Cary, N. C. |
| Louis John Metz, *M.F., Ph.D.*<br>*Adjunct Associate Professor of Forest Soils* | 203 Waldo Street, Cary, N. C. |

## *Associate Faculty*

| | |
|---|---|
| Kiro Pete Arges (1953), *M.S.* in *C.E.*<br>*Assistant Professor of Civil Engineering* | 802 W. Maynard Avenue |
| Donald J. Fluke (1957), *Ph.D.*<br>*Associate Professor of Zoology* | 2703 Sevier Street |
| Frederick Charles Joerg (1947), *M.B.A.*<br>*Professor of Economics* | 2424 Wrightwood Avenue |
| Terry Walter Johnson, Jr. (1954), *M.S., Ph.D.*<br>*Associate Professor of Botany* | 2408 Prince Street |
| Aubrey Willard Naylor (1952), *M.S., Ph.D.*<br>*Professor of Botany* | 881 Louise Circle |

### STAFF

| | |
|---|---|
| Mrs. Marie M. Broadwell<br>*Recorder and Secretary to the Dean* | 1306 Norton Street |
| Reid Lamar Folsom, *M.F.*<br>*Superintendent, Duke Forest* | 2722 Erwin Road |
| Mrs. Edwina Johnson, *B.S. in L.S.*<br>*Librarian, Forestry-Biology* | 1606 Peace Street |
| Wade C. Boyd, *B.S.F.*<br>*Technical Assistant in Forestry* | 3325 E. Glasson Street |
| Mrs. Brenda Lunsford<br>*Bookkeeper, Duke Forest* | Route 1, Timberlake, N. C. |
| Mrs. Patricia Rorie<br>*Secretary* | 1914 Washington Street |
| Mrs. Jo W. Russell<br>*Secretary* | 804 N. Alston Avenue |
| Mrs. Sue P. Woods<br>*Statistical Clerk* | 501 E. Lavender Street |

# Forestry in Duke University

DUKE UNIVERSITY, located at Durham, North Carolina, comprises Trinity College, the Woman's College, the College of Engineering, the Graduate School of Arts and Sciences, and the professional schools of Forestry, Divinity, Law, Medicine, and Nursing. The University dates from 1838, when Union Institute was founded in Randolph County by the Methodists and Friends. In 1851 the institution became Normal College, one of the first schools in America for the training of teachers. In 1859 the name was changed to Trinity College and so continued until 1924, when the College became a part of Duke University.

By virtue of an indenture of trust, executed December 11, 1924, by James Buchanan Duke, a great benefaction was placed at the disposal of humanity by providing for hospitalization, church work in rural communities, and education. The principal feature of the educational provision was the creation of Duke University.

The University, with a student body of over 6,400, occupies two campuses. The Woman's College campus of 108 acres was formerly the campus of Trinity College. About a mile west are the new units of the University, known as the West Campus, totaling 467 acres. It was first occupied in September, 1930.

Forestry in Duke University began early in 1931 when the Duke Forest was placed under intensive forest management and forestry research was initiated. An academic-forestry curriculum, designed for students intent upon pursuing the study of forestry as a profession, was organized in Trinity College of Duke University in 1932. This program was enlarged in 1956 and now includes more than 60 cooperating colleges and universities. (See pages 41-43.)

In 1938 the School of Forestry was organized at the graduate level and a curriculum was offered leading to the degree Master of Forestry. Work leading to the degree Doctor of Forestry has been offered since 1940. The School has been fully accredited since its origin. A degree in technical forestry at the undergraduate level is not offered at Duke University.

Graduates of recognized colleges and universities, and professional schools of forestry, and other men who meet the entrance requirements of the School (see page 13), may enroll for training in technical forestry leading to the professional degrees, Master of Forestry and Doctor of Forestry. The Graduate School of Arts and Sciences also

offers graduate work in certain aspects of forestry leading to the degrees Master of Arts and Doctor of Philosophy. This work is available to graduates of schools of forestry of recognized standing, and to college or university graduates holding a Bachelor's degree with their major work in appropriate subjects.

Students taking undergraduate work and who are planning to matriculate in the School for programs of study leading to degrees Master of Forestry or Doctor of Forestry should refer to the section in this announcement (page 18) where entrance requirements are presented.

## *Educational Facilities*

The School of Forestry is housed in the south wing of the Biological Sciences Building on the West Campus. The programs of the School provide for classroom, laboratory, and field instruction in the fundamental disciplines of forestry and wood technology. Specialized training may be elected in forest management, forestry business management, forest economics, silviculture, silvics, forest entomology, forest biometry, forest pathology, mensuration, forest soils, tree physiology, forest hydrology, forest climatology, wood anatomy, timber physics, chemistry of wood, harvesting and processing, and several other areas in forest products technology.

General and research laboratories are provided for routine and original studies in all of the subject matter fields. These laboratories are equipped with instruments and facilities for quantitative evaluation of biological materials and processes. Greenhouses immediately adjacent to the Biological Sciences Building and the nearby Duke Forest offer excellent facilities for biological investigations in controlled and natural environments. An IBM 7072 Digital Computer system (with supporting 1401 system), housed in the Physics Building, is available for processing research data.

Facilities of allied departments of the University are also available for advanced work in biochemistry, chemistry, economics, genetics, mathematics, plant anatomy, plant ecology, plant pathology, and plant physiology.

West Virginia Pulp and Paper Company has made available to Duke University a field headquarters for work in the forests of the South Atlantic Coastal Plain. This camp, located 18 miles northwest of Summerville, South Carolina, is used as a base for field instruction in timber harvesting, wood utilization, soils, silviculture, and forest management.

The School periodically sponsors conferences and symposia on industrial forest management and other technical and scientific sub-

jects. These offer the current viewpoints of many outstanding individuals in both forestry and in allied fields.

The University libraries, with nearly 1,600,000 volumes and about 3,000,000 manuscripts, provide exceptional resources and facilities for study and research by undergraduate and graduate students, and by visiting scholars. About 55,000 volumes are added annually, while 125 foreign and domestic newspapers and over 6,000 periodicals are received currently. Large collections of microfilms of rare books, newspapers, and periodicals are also available.

The Biology-Forestry library (80,338 volumes), Chemistry library (20,398), and Physics-Mathematics library (26,277) are housed for convenience of use in the buildings of these departments. The libraries of the Schools of Divinity (108,560), Law (129,838), Medicine (72,891) and of the College of Engineering (31,847) are also shelved in the buildings of these schools, all on the West Campus.

## *The Duke Forest*

The Duke Forest, of approximately 7,000 acres, is particularly well situated for field work. A five-minute walk from the campus will take one well into many parts of the area, while even the most distant portions can be reached by automobile in about twenty minutes.

Short-term research projects are conducted on the Forest by graduate students in forestry, botany, zoology, and other disciplines. More extensive problems are investigated by the faculty with student assistance, segments of which may be used by students for observation, analysis, and interpretation. Many of these studies serve admirably as instructional material. The Forest provides additional instructional material, as well as demonstrations on an operational scale, of advanced forest practices developed at Duke and elsewhere.

The Forest lies in Durham and Orange Counties near the eastern edge of the Piedmont Plateau. A cross-section of much of the woodlands in the upper coastal plain and lower Piedmont of the Southeast is represented on the Forest with its variety of topography, soil, forest conditions, and patterns of past land use. Elevations range from 280 to 760 feet The soils are derived from such diverse parent material as metamorphic rock of the Carolina slate formation, granite, Triassic sedimentary rock, and basic intrusives. Nearly one hundred tree species are represented. Some eighteen miles of improved woods roads make all parts of these woodlands readily accessible. It serves as an outdoor laboratory for instruction in forestry and allied fields, and as an experimental forest for research in problems of timber growing and in the sciences basic thereto. It is also used to demon-

strate methods of silviculture and forest management applicable to the region.

At few other places in America are there provisions for extensive field study and research in forestry literally at the door of a large university. This natural outdoor laboratory, so conveniently located and representative of the region, is a most valuable supplement to the instructional, laboratory, and library facilities of Duke University.

## *Forest Sciences Laboratory*

The establishment of the Forestry Sciences Laboratory research facility of the Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the School of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The research staff of the Laboratory is available for consultation, participates in seminars and may serve on graduate committees of students in the School of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

# Requirements for Admission to the School of Forestry

THE admission requirements of the School of Forestry for work toward the MASTER OF FORESTRY degree presuppose that an applicant is either:

1. A graduate of a professional school of forestry, or
2. A graduate of a college or university of high standing, but without prior professional training in forestry, or
3. A student who has successfully completed the pre-forestry curriculum of one of the colleges (listed on pages 41-43) cooperating with the School in the academic-forestry training program.

Each applicant must present a certified transcript of his academic record showing the courses he has taken, the number of credit hours he has earned and the grades received. The total number of quality points* must be at least two and one-half times the total credit hours to meet the minimum scholastic standards required for admission to the School. An applicant also must have satisfactorily completed undergraduate work in minimum amount, as follows:

One year of biology, including at least one semester of botany; or one year of botany.
One year of chemistry.
One course each in physics and the principles of economics.
Mathematics, through college algebra and trigonometry.

It is urged that an applicant without professional training in forestry present additional credits in the above subjects and in one or more of the following disciplines: soils, geology, mineralogy, petrology, climatology, surveying, languages (particularly German and French), sociology, political science, philosophy, psychology, and zoology.

An applicant who is a graduate of a professional school of forestry will present a certified transcript of his scholastic record showing the attainment of a degree. Before registering for the first semester of residence, the students will be required to select the branch or branches of forestry in which they wish to concentrate the major part of their work and to prepare their proposed programs in conference

* Grades for each hour of college are valued in quality points as follows: "A," 4 points; "B," 3 points; "C," 2 points; "D," 1 point; and "F," no points.

with an appropriate faculty advisory committee. Ordinarily, graduates of a fully accredited school of forestry should be able to meet all requirements for the Master of Forestry degree in one full school year of resident study; others may require a longer period of residence.

Students must make application for admission in advance of the opening of the school year. Those students entering without acceptable courses in plane surveying, forest surveying, forest mensuration, and silvics must take the work in these subjects in the Summer Session, and are required to submit their applications prior to May 1. Students entering with advanced standing in these courses should make application before September 1. Application blanks will be sent upon request made to the Dean of the School of Forestry.

Admission to the School of Forestry for a program of study and research leading to the degree, DOCTOR OF FORESTRY, is granted to a student who has received the degree, Master of Forestry, or its equivalent, from a school of forestry of recognized standing, and who has achieved an average of three quality points per hour of credit in his previous graduate studies.

An applicant must file a formal application for admission together with transcripts of his undergraduate and graduate academic records. In his application he should clearly state the branch of forestry in which he desires to concentrate, and if possible, the specific research.

The Committee on Admissions of the School of Forestry, together with the prospective student's major advisor, will determine if the qualifications of the applicant meet entrance requirements.

GRADES. Grades in the School of Forestry are as follows: E (exceptional); G (good); S (satisfactory); F (failing) and I (incomplete). The instructor who gives an I for a course specifies the date by which the student must make up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, the statement, NO CREDIT, is made upon the student's permanent record.

# Requirements for the Degree of Master of Forestry

THE requirements for the degree of Master of Forestry (M.F.) are governed by the extent of the student's previous professional training. Normally, students who have earned the degree of Bachelor of Science in Forestry, or equivalent, from an accredited school of forestry may complete the requirements for the M.F. degree in one academic year. Students who have had no prior professional training in forestry are required to complete one summer session and two academic years of resident study. Graduate work of equivalent grade done in residence at other institutions may, with the approval of the Faculty, be accepted as credit toward the degree, but a minimum of one year of residence at Duke University is required.

The submission of a thesis for the M.F. degree usually is required. With the approval of the Faculty, an acceptable report on a special study may be submitted in lieu of a thesis, credit for which will not exceed three semester hours. Four copies of the thesis, typewritten and bound in accordance with regulations set forth by the Faculty, must be deposited with the Dean of the School of Forestry on or before May 15 of the academic year in which the student expects to obtain the M.F. degree.

No student may take less than fourteen nor more than eighteen semester hours of credit per semester without special permission of the Faculty.

## POST-PROFESSIONAL PROGRAM

Students with satisfactory undergraduate professional training qualify for advanced study and research in the various disciplines of forestry under this program. A specific study plan is developed for each student through consultation with a faculty advisory committee. For the student planning a managerial career in the general area of forest production or in forest products technology (and where the Master of Forestry is planned as a terminal degree), these study plans usually consist of courses and seminars with a major portion of the work concentrated in the areas of the student's interests. For the student with research interest, the study plan is oriented within the subject matter field of interest toward the furtherance of a research

career, or toward preparing him for academic training beyond the master's level.

A number of senior-graduate courses offered in other departments of the University (see pages 37-40) are open to qualified students in the School of Forestry. One or more of these may be included in a student's study plan when deemed advisable by his advisory committee.

A minimum of thirty semester credit hours, in which the student must earn a grade of E or G in at least nine hours, are required for the degree, Master of Forestry, under this program. Normally, 15 hours of credit (including thesis) must be earned in the School of Forestry.

## POST-LIBERAL ARTS AND SCIENCES PROGRAM

A student who has had no prior professional training in the areas of specialization offered in the School of Forestry is required to begin his studies with a summer term of twelve weeks. Two full academic years of study in addition to the work of the Summer Session are required under this program for the attainment of the degree, Master of Forestry. Any student who does not earn a grade of E or G in at least nine hours of work in the first academic year will not be permitted to enter into the work of the second year.

### SUMMER SESSION

| | S.H. |
|---|---|
| Plane Surveying (C.E. 110) | 3 |
| Forest Surveying and Aerial Photo Interpretation (F. 150) | 3 |
| Silvics (F. 243) | 3 |
| Forest Mensuration (F. 151) | 3 |

### FIRST YEAR

| *Fall Semester* | S.H. | *Spring Semester* | S.H. |
|---|---|---|---|
| Forest-tree Physiology (F. 201) | 3 | Harvesting and Utilization of Forests (F. 212) | 3 |
| Forest Entomology (F. 230) | 3 | Harvesting and Forest Products Field Seminar (F. 218) | 1 |
| Dendrology (F. 241) | 3 | Forest Pathology (F. 223) | 3 |
| Forest Soils (F. 261) | 3 | Forest Policy (F. 276) | 2 |
| Forest Economics (F. 270) | 3 | Forest Biometry (F. 250) | 3 |
| Theory and Practice of Silviculture (F. 244) | 3 | Wood Anatomy (F. 290) | 3 |
| | | Forest Management (F. 281) | 3 |

### SECOND YEAR

During the latter part of the second semester of the first year each student will be requested to designate the subject matter field (or

fields) he wishes to pursue in the second year. Those who successfully complete the work of the first year will be assigned a faculty advisory committee who, in consultation with the student, will develop his study plan in a manner identical with that described under the Post-Professional Program (see page 15).

## FORESTRY BUSINESS MANAGEMENT PROGRAM

A specialized program is offered in the School of Forestry, in cooperation with the Department of Economics and Business Administration, to meet the long-standing demand for forestry personnel well grounded in the principles of economics and well versed in the managerial process. This program involves two years of work leading to the degree of Master of Forestry and is open to selected students who have already earned the bachelor's degree in forestry or its equivalent, and who have demonstrated leadership qualities indicative of potential administrative and executive capacity.

The essential requirements of the program are as follows:

1. A minimum of 30 semester hours in courses in economics and business administration or closely allied fields.
2. A minimum of 15 semester hours concentrated in the areas of forest economics, management, and statistics.
3. Serve in a paid managerial trainee position with a cooperating forest industry or business for a period embracing the included summer and fall semester of the second year.
4. Formulate an analysis of some phase of the managerial operation of the company with which the training period is spent.

The specific program of study, commensurate with the above minimum standards and the student's academic background, will be developed by the program advisory committee in consultation with the student. A sample of suggested courses included in such a program, and admission application forms are available from the Dean of the School of Forestry.

# Requirements for the Degree of Doctor of Forestry

THE degree Doctor of Forestry (D.F.) is a professional and research degree conferred on those students who have satisfactorily completed specified requirements of advanced study and research. Although course work is a necessary part of a student's program, the mere accumulation of course credits will not be sufficient for the attainment of this degree. The granting of the D.F. degree is based primarily upon the student's thorough knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Work toward the D.F. degree, consisting of advanced studies in a major and a minor field, is offered with majors in the following branches of forestry: forest economics, forest entomology, forest management, forest mensuration, forest pathology, forest soils, forest-tree physiology, silvics, silviculture, forest biometry, forest hydrology, forest climatology, wood anatomy, timber physics, wood chemistry, and forest utilization. A minor may also be elected in any of these branches of forestry or in other areas of specialized study in the University approved by the Graduate School of Arts and Sciences. Prospective students should correspond with the Dean of the School of Forestry on all matters pertaining to admission to the School.

PROGRAM OF STUDY: A committee consisting of five members of the Faculty will be appointed by the Dean to supervise the work of each student. This committee will consist of a major advisor and four other faculty members. The major advisor will serve as Committee Chairman.

The student, in consultation with the advisory committee, will prepare a proposed program of study and research. After acceptance by the Committee, it will be presented to the Faculty of the School of Forestry for final approval. If in the judgment of the Committee the student's prior training is inadequate, he may be required to remedy such deficiencies by taking certain undergraduate courses as prerequisites to continued graduate study, but which will carry no graduate credit.

The program will consist of courses, seminars, arranged work and research, approved for graduate credit by the faculty of the School of Forestry. Satisfactory completion of a minimum of 30 semester

hours of formalized academic work in which the student must attain a grade of E or G in at least 12 hours is required of all prospective candidates. Credit hour requirements for the major and minor fields are determined by the Committee. The student's program of study necessarily demands substantial concentration on courses in his major department. A minor, if elected, will consist of at least 12 semester hours, part or all of which may have been included in the program for the Master's degree. If a minor is not elected, a minimum of six semester hours in a single subject matter area outside the major field must be included in the program of study.

FOREIGN LANGUAGES: A reading knowledge of two foreign languages is required. Normally these will be French and German. Spanish or another foreign language may be substituted for either French or German when deemed advisable by the Committee. The foreign language examinations will be conducted by the appropriate language departments of Duke University. At least one of the language requirements must be met during or before the student's first regularly enrolled semester at Duke University. Students not able to comply with this regulation will be required to reduce their maximum allowable load in succeeding semesters by 3 semester hours until the first language requirement has been met. The second language requirement must be met before the student is permitted to take the comprehensive preliminary examination. Enrollment in non-credit language courses at Duke University will be considered a part of the student's maximum allowable load in any one semester.

LANGUAGE EXAMINATIONS: On Monday of the fall registration period and on the day before spring registration, reading, vocabulary, and grammar tests in French and German are offered (see the Calendar for hour and place). Any entering student who has not taken these tests may do so. On the basis of his scores the student will (1) be certified as meeting requirements in these languages, (2) be advised to present himself for the regular reading examinations at the first opportunity, or (3) be advised to enroll in the special reading courses.

READING EXAMINATIONS: At dates listed in the Calendar, reading examinations in French and German are offered. Reading examinations in other languages must be separately arranged.

Students requiring the reading examination at other times must pay a special fee of $5.00 prior to registering in the Graduate Office for the examination. Students who require re-examination at scheduled times will be charged $5.00 for each re-examination; if special times are necessary, the fee will be $10.00.

COMPREHENSIVE EXAMINATION: At least six months before

the student expects to receive the D.F. degree, and after he has completed most of his formal course work, he will be required to take a comprehensive examination. The examination will be written in subject areas specified by the Committee and may be followed by an oral examination given by the Committee. The decision as to whether the examination has been passed or failed is the responsibility of the Committee.

PRIVILEGE OF RE-EXAMINATION: Should the student fail the comprehensive examination, he may apply, with the consent of his supervisory committee and of the Dean of the School of Forestry, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the D.F. degree at Duke University.

Upon satisfactory completion of the comprehensive examination the student will be considered a candidate for the D.F. degree.

RESIDENCE REQUIREMENTS: The minimum period of study beyond the M.F. degree, or its equivalent, is two years of academic work of which at least two regular semesters must be spent in full-time study on the campus in Durham. Graduate work of a fragmentary nature taken over a period of several years will not meet this requirement. Course work of equal grade taken at another college or university of approved standing may, with approval of the Faculty of the School of Forestry, be accepted in partial fulfillment, but shall not exceed 15 semester hours of the total requirements. Such transfer of credit may not under any circumstances be used to reduce the two regular semesters of full-time study which must be spent at Duke University. Course work taken under the cooperative interchange-of-registration plan between the graduate schools of Duke University and the Consolidated University of North Carolina is considered the same as work taken on the campus in Durham.

A student who has successfully completed the 30 hours of required formalized study, met the language requirements, and passed the comprehensive examination, may, with the approval of his supervisory committee and the Dean of the School of Forestry, continue his research and complete his dissertation *in absentia*. Under this arrangement he is required to register for one hour of research credit each semester until the degree has been awarded.

A student who remains in residence after passing the preliminary examination must register for a minimum of three semester hours of research credit each semester unless his course-seminar registration is at least nine hours, in which case the 3-hour registration requirement is waived.

DISSERTATION: In addition to obtaining adequate training in the field of his specialty, the student must demonstrate his ability to plan and conduct sound, original research. Evidence of this accomplishment must be presented in the form of an acceptable dissertation embodying the results of original work, which is a definite contribution to knowledge. Course credit is not granted but students must register for dissertation research.

The subject of the dissertation must receive the approval of the Faculty, and the title must be filed with the Dean of the School of Forestry on or before October 15 of the academic year in which the candidate desires to take his final examination.

The dissertation will normally be submitted for acceptance within two calendar years after passing the preliminary examination. Should it not be submitted within four calendar years after the examination, the candidate may, with the approval of his committee, petition the Dean of the School of Forestry for an extension of one year.

If the dissertation is not submitted and accepted within five years after the examination, the candidate must pass a second preliminary examination. Following the second examination, the student's doctoral committee will determine possible additional requirements and set time limits within which the dissertation must be completed and accepted.

After the dissertation has been approved by the major advisor, and at least 10 days prior to the date set for the final examination, the candidate is required to deposit with the Dean of the School of Forestry the original and three typewritten and temporarily bound copies together with 10 copies of an abstract of the dissertation consisting of not more than 600 words. Following acceptance of the dissertation by the Committee, the student will deposit with the Dean of the School of Forestry on or before April 15 of the academic year in which the student expects to obtain the D.F. degree, the original unbound copy of the dissertation together with three carbon copies (also unbound) and 10 copies of the approved abstract. The first carbon copy will be deposited in the University Library, the major advisor will receive one copy, and the fourth copy will be returned to the student. The original copy will be sent to University Microfilms, Ann Arbor, Michigan, where it will be reproduced and published on microfilms. Later the original will be returned to Duke University where it will be bound and deposited in the University Library.

The basic requirements for preparing the dissertation are described in the *Manual of Style for Theses and Dissertations* which may be obtained from the Duke University Book Store, West Campus. Additional instructions concerning the microfilming, preparation of title page and the abstract should be obtained from the Dean's office.

At the time the final approved copies of the dissertation and the abstract are deposited with the Dean of the School of Forestry, the candidate must show evidence of having paid a fee of $25.00 to the Treasurer of the University to cover the costs of microfilming.

FINAL EXAMINATION: The final examination will be in defense of the candidate's dissertation and on related subject matter. It will be oral and will be conducted by the advisory committee. At least six months must elapse between the dates of the preliminary and the final examinations.

# Forestry in the Graduate School of Arts and Sciences

MAJOR and minor work is offered in several disciplines of forestry leading to the A.M. and Ph.D. degrees, which are administered by the Graduate School of Arts and Sciences. Work for these degrees may be pursued only in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest biometry, forest climatology, forest entomology, and forest economics. Students who have had specialized training in botany or soil science and in allied basic subjects, such as physics, chemistry, geology, and zoology, may pursue graduate study and research only in the specialized fields for which their previous work has qualified them. Students who do not have previous training in forestry will be required to complete a minimum of thirty semester hours of approved work in forestry as a preliminary requirement to advanced study for the A.M. and Ph.D. degrees.

Applicants for admission to the Graduate School must ordinarily have made not less than a "B" average in their undergraduate work, and must not have concentrated excessively in one field of study to the detriment of a rounded program. They should have met substantially the requirements for the A.B. or B.S. degree at Duke University.

In addition to fulfilling the usual requirements for admission, the applicant must satisfy the Director of Graduate Studies in Forestry as to his liberal arts training, as well as to his preliminary training in the field of forestry.

For detailed information concerning admission to the Graduate School, and for regulations governing candidacy for the A.M. and Ph.D. degrees, language requirements, residence requirements, and other regulations concerning these degrees, the student should consult the *Bulletin* of the Graduate School of Arts and Sciences.

# Tuition, Fees, and Expenses

THE following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration and no student is admitted to classes until arrangements have been made with the Treasurer of the University for the settlement of fees.

## *General Fees*

| | |
|---|---|
| Tuition, per semester | $525.00 |
| General Fee, per semester | $ 72.50 |
| Spring field seminars | $ 10.00 |

Forestry students may obtain admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of an athletic fee of $15.00 per year plus any Federal taxes that may be imposed. This fee is payable in the fall semester.

TRANSCRIPTS: A student is entitled to one free transcript of his academic record. A charge of one dollar is made for each additional copy.

PAYMENTS TO FELLOWS AND SCHOLARS: Payments by the University of stipends to fellows and scholars are made in eight monthly installments, beginning October 20. Fellows and scholars are required to pay the regular tuition fee and such additional fees as are ordinarily required of all graduate students.

## *Living Accommodations*

The Men's Graduate Center is available to men of the graduate and professional schools. It contains bedroom facilities for four hundred men, complete with lounges, study rooms, recreational rooms, post office and dining hall. The rooms are equipped for two persons and the rental charge for a double room is $500.00 for the academic year, or $250.00 for each occupant, or $125.00 for each occupant each semester.

Rooms are rented for the academic year, but for no period of less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedules.

Room reservations are made through the Housing Bureau only after official acceptance for admission to the University. A $25.00 room deposit is required of each applicant before a room reservation is made. The initial room deposit is effective during the student's residence in the University if attendance is continuous in regular academic years. This deposit will be refunded under the following conditions:

a. Within thirty days after the student has been graduated.
b. Upon withdrawal from the University, provided written notice is received in the Housing Bureau by August 1, for cancellation of a reservation for the fall semester; and not later than January 15, for cancellation of a reservation for the spring semester.
c. When the reasons requiring withdrawal are beyond the student's control.

No refund is made until the occupant has checked out of his room through the Housing Bureau and has settled all of his accounts with the Treasurer.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation in accordance with the plan that is published during the school year.

Any exchange of rooms must be arranged at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to charges for both rooms.

The authorities of the University do not assume responsibility for the persons selected as roommates. Each student is urged to select his roommate when the room is reserved.

Beds and mattresses (39" x 74"), tables, chairs, dressers, mirrors, and window shades are furnished by the University. The student supplies linens, blankets and pillows. Rugs, totaling not more than 54-square-feet, study lamps and curtains are permissible, and if desired, are furnished by the students.

Duke University Apartments are available to married graduate students. The rental rates per month have been set at $70 for an efficiency apartment, $80 for a one-bedroom apartment, and $90 for a two-bedroom apartment. For further information on apartments for married students, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Duke University desires to provide for its students a residential environment conducive to academic achievement, the development of high ideals, and sound character. The institution asks and believes that each student will cooperate in achieving these aims by arranging his personal belongings in an orderly manner, by caring for the build-

ings and furniture as he would in his own home, and by observing a code based on gentlemanly behavior in an educational environment which demands respect for all residents. Regulations governing the occupancy of rooms will be supplied directly from the Housing Bureau when room reservations are made. Occupants are expected to abide by these regulations.

Firearms (including air rifles) may be brought into the residence halls only upon written permission and registration with the Dean of Men of Duke University.

## *Dining Service*

The dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room where full meals and a la carte items are served. The cost of the academic year ranges from $450.00 upward depending on the tastes of the individual.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 A.M. to 11:00 P.M. The prices in these dining rooms are the same as those on the West Campus.

It is hoped that present rates may be maintained. Charges, however, are necessarily dependent on costs of labor, food, and materials, and some adjustment may be necessary.

Due to the large number of those served in the dining halls, it is not possible to arrange special diets for individual students. Special diet for the sick is served in the infirmary.

## *Estimated Expenses for an Academic Year*

The necessary expenses of a graduate student are moderate. The University dormitories provide thoroughly comfortable and wholesome living conditions at a minimum cost, while all charges made by the University have been kept low. Incidental expenses naturally depend upon the tastes and habits of the individual. The following table summarizes college expenses for one year:

| | Low | Moderate | Liberal |
|---|---|---|---|
| Tuition | $1050.00 | $1050.00 | $1050.00 |
| General Fees | 145.00 | 145.00 | 145.00 |
| Room-rent | 250.00 | 250.00 | 300.00 |
| Board | 450.00 | 500.00 | 550.00 |
| Laundry | 25.00 | 35.00 | 45.00 |
| Books | 50.00 | 60.00 | 70.00 |
| Athletic Fee (optional) | 15.00 | 15.00 | 15.00 |
| Spring field seminars | 10.00 | 10.00 | 10.00 |
| | $1995.00 | $2065.00 | $2185.00 |

## *Medical Care*

Forestry students who pay at least ⅗ full tuition and fees for the semester or the term of the Summer Session during which illness occurs are eligible under the Student Health Program. They are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided for men at the Student Health Office in Duke Hospital.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, and elective surgery.

Forestry students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. The complete medical facilities of the Duke University Medical Center are available to all members of the University community.

## *Motor Vehicles*

Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 07 Allen Building within five days after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student must present the following documents: (1) state vehicle registration, (2) state operator's license, (3) evidence of automobile liability insurance as required by North Carolina law ($5,000 per person, $10,000 per accident for personal injuries; $5,000 for property damage).

All students owning motor vehicles and living in the Men's Graduate Center are required to pay an annual parking rental fee of $30.00.

## *Student Activities*

Forestry students new to Duke University are reminded that they are welcome to use such recreational facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, instrumental, drama, and religious groups.

Students are encouraged to maintain broad professional contacts by participation in the activities of the Society of American Foresters, the Forest Products Research Society, the national honorary scientific

society of Sigma Xi, and other societies appropriate to their major field of study.

The social and business events of the Forestry Club provide opportunities for many pleasant extracurricular activities. An active organization of the wives of forestry students offers a regular schedule of social occasions of interest to this group.

## *Bureau of Testing and Guidance*

The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

## *Appointments Office*

Duke University maintains an active Appointments Office which has steadily been placing students in teaching, governmental and industrial positions. The services of this office are available without charge to graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use in securing employment a complete file containing their academic record and pertinent recommendations, should register in this office.

# Financial Aid

## *Fellowships, Scholarships, and Assistantships*

A NUMBER of fellowships, scholarships, and assistantships are allocated to the School of Forestry for the encouragement and financial assistance of men who offer promise of becoming leaders in the forestry profession. These are awarded to applicants of high character on the basis of scholastic ability as judged by previous educational performance, professional experience, personal references and the Graduate Record Examination.

Holders of the awards will pay tuition and such additional fees as are regularly required.

The awards are of three classes:

FELLOWSHIPS: From five to eight fellowships, with stipends ranging from $1500-$2500 per academic year. Each recipient must have previously completed work equivalent to that required at Duke University for a Master's degree with a major in forestry or in a discipline basic to forestry. He will devote his time to an approved program of study and research in any of the branches of forestry. He is expected to become a candidate for the degree of Doctor of Forestry or Doctor of Philosophy.

SCHOLARSHIPS: From fifteen to eighteen scholarships with stipends ranging from $1250-$2000 per academic year. Each recipient will normally devote his time to an approved program of study leading to the degree of Master of Forestry, or Master of Arts with a major in forestry.

GRADUATE ASSISTANTSHIPS: One to several graduate assistantships with variable stipends up to $3600, depending upon available funds and upon whether granted for the academic year only, or the academic year plus the summer. Each recipient will devote half-time to research or other work of the School of Forestry. He will be permitted to enroll for not more than 20 semester hours in an academic year in an approved program of study, or study and research, leading to a degree of Master of Forestry, Master of Arts, Doctor of Forestry, or Doctor of Philosophy.

Two $3200 research assistantships, one in Forest Pathology, one in Forest Entomology, sponsored by the Southern Forest Disease and Insect Research Council, are available to qualified candidates.

Three industry-sponsored stipends are also awarded annually to qualified scholars. These are: *The Koppers Company, Inc. Scholarship* of $1600.00; and *The Brunswick Pulp and Paper Company Fellowship for Research in Hardwood Silviculture* of $2000.00, and *The Lilly Company Scholarship of* $1600.00.

APPLICATION FOR AWARDS: Any student admitted to the School of Forestry is eligible to apply for a fellowship, a scholarship or an assistantship. Application for these awards may be made concurrently with the application for admission.

The general procedures and requirements for applying for any financial award in the School of Forestry are outlined below. Applicants should initiate the necessary action early to insure that the required documents are filed with the Dean of the School of Forestry on or before March 1 prior to enrollment.

1. File award application. Form will be supplied by the School of Forestry on request.
2. Furnish supporting documents as follows:
   a. Official transcripts of record of all previous college or university credits earned.
   b. Letters of reference from at least three persons familiar with the applicant's character, scholarship, and professional ability.

(Documents offered in support of admission, if so designated, may also serve in support of the application for financial award.)

3. Complete the Aptitude Test of the Graduate Record Examination. Instructions and application for admission to this locally administered examination are available on most college campuses, from the Duke School of Forestry, or by writing the Educational Testing Service, Princeton, New Jersey. Applicants should plan to take this examination in January or earlier.

Notification of awards is made on April 1. In case vacancies occur, completed applications received after March 1 will be considered at a later date.

In every instance where a graduate assistantship, scholarship, or fellowship for the next academic year is offered to an actual or prospective graduate student and accepted before April 15, the accepter may resign his appointment without prejudice prior to that date by notification in writing to the Dean. However, an acceptance given or left in force after April 15 obligates him not to accept another appointment without first obtaining formal release from the Dean of the School.

## *Student Loans*

Students who have completed at least one semester in residence and who have satisfactory academic and citizenship records are eligible to apply for student loans. Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958, are available to qualified students.

Loans from university funds generally mature after borrowers have left the University. Interest accrues on long-term loans from University funds at the rate of one percent per annum from the date of each note. After a student has left the University permanently, the loans begin accruing interest at the rate of three per cent per annum.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of these loan funds normally begins one year after the student terminates his education at the University. Interest accrues at the rate of three percent per annum commencing at the time of the first payment, with complete repayment scheduled within a ten-year period. Special benefits to those teaching in the public schools permit a portion of the loan to be cancelled depending upon the length of teaching service. Complete details regarding the student loan program may be obtained by writing directly to the Executive Secretary of the University Scholarship Committee.

The Student Loan Committee in approving loan applications selects those students who, from the standpoint of character, scholastic attainment, personality and degree of financial need, are deserving of this consideration. All applications for loans should be made to the Executive Secretary of the University Scholarship Committee.

# Courses and Subjects of Instruction

## SCHOOL OF FORESTRY COURSES
### IN THE SUMMER SESSION

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit, tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. *Three weeks, eight hours a day beginning June 10, 1964.* 3 s.h. (w) ASSISTANT PROFESSOR ARGES

150. FOREST SURVEYING AND AERIAL PHOTO INTERPRETATION.—Application of plane surveying to forest problems; practice in making boundary, topographic, and cover type surveys; details of land ownership and transfer, title search, and deed descriptions. One week will be spent in the study of the principles of aerial photogrammetry and photo interpretation, and may be taken separately for 1 hour of credit. Prerequisite: Civil Engineering 110, or equivalent. *Three weeks, eight hours a day, beginning July 1, 1964.* 3 s.h. (w) PROFESSOR CHAIKEN

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environment. *Three weeks, eight hours a day, beginning July 22, 1964.* 3 s.h. (w) ASSISTANT PROFESSOR WOODS

151. FOREST MENSURATION.—Field studies in methods of measuring content and growth of trees and forest stands; practice in timber estimating, log scaling, use of mensurational instruments, and collection of basic data. *Three weeks, eight hours a day, beginning August 12, 1964.* 3 s.h. (w) PROFESSOR OSBORNE

### REGULAR SESSION COURSES FOR SENIORS AND GRADUATES

201. FOREST-TREE PHYSIOLOGY.—The principal physiological processes of trees, including water relations, synthesis and use of foods, and growth phenomena. Prerequisites: Botany 1-2 or equivalent; one year of chemistry. 3 s.h. (fall). PROFESSOR KRAMER

212. HARVESTING AND UTILIZATION OF FORESTS.—Principles, procedures, and cost determinations in harvesting timber products with emphasis on managed forests in North America. Processing of wood as a raw material by important forest industries. 3 s.h. (spring). PROFESSOR WACKERMAN

216. LUMBER MANUFACTURE.—Methods of processing logs for sawn products with emphasis on the principles involved in obtaining maximum volume and quality yield for large and small mills; trends in lumber consumption by regions; use of waste for by-products; the development of new lumber products; and industry problems. Prerequisite: Forestry 212 or equivalent. 3 s.h. (spring). PROFESSOR WACKERMAN

218. HARVESTING AND FOREST PRODUCTS FIELD SEMINAR.—Field studies of the major regional forest products industries; observation and application of harvesting techniques. 1 s.h. (spring). ASSISTANT PROFESSOR WHITE

223. FOREST PATHOLOGY.—Principles of plant pathology with special emphasis on representative forest tree diseases; introduction to forest products pathology. Related field and laboratory studies of regional tree diseases and deterioration of wood products. Prerequisites: Botany 1-2, or equivalent. 3 s.h. (spring). ASSISTANT PROFESSOR STAMBAUGH

230. FOREST ENTOMOLOGY.—Principles of protecting forests from injurious insect infestations; characteristics and identification of insect-caused damage to trees and wood products; identification, biology, and control of the more important tree-infesting insect species. 3 s.h. (fall). PROFESSOR ANDERSON

232. FOREST PRODUCTS ENTOMOLOGY.—Study of the characteristics and identification of various types of injury to wood products caused by insects and other wood-damaging animals; identification, biology, and control of wood-damaging animals. Prerequisite: Forestry 230 or equivalent. 2 s.h. (spring).
PROFESSOR ANDERSON

241. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisites: one year of biology including botany. 3 s.h. (fall).
PROFESSOR HARRAR AND ASSISTANT PROFESSOR WHITE

244. THEORY AND PRACTICE OF SILVICULTURE.—Principles governing establishment, treatment, and control of forest stands; natural and artifical methods of reproduction, intermediate cuttings, and cultural operations with emphasis on the principal forest types of temperate North America. Field practice in silvicultural operations and study of managed stands. Prerequisite: Forestry 243 or equivalent. 3 s.h. (fall). ASSISTANT PROFESSOR WOODS

248. FOREST REGENERATION.—Fundamentals and practices of regenerating forest stands. Genetic control through recently developed propagating techniques; seed handling in the field, and during preparation for use; techniques for large production tree nurseries; the use of heavy equipment, chemicals, and fire for site preparation and timber stand improvement; recent developments in direct seeding and planting. 3 s.h. (fall). ASSISTANT PROFESSOR WOODS

250. FOREST BIOMETRY.—Statistical methods essential to the collection, analysis, and interpretation of forest data; includes regression and correlation techniques, Chi-square tests of associations, and tests of significance; short-cut computational procedures. Special attention is devoted to the use of statistical techniques in forest administration and mensuration problems. 3 s.h. (spring).
PROFESSOR OSBORNE

251. SAMPLING METHODS IN FORESTRY.—Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 s.h. (Not offered 1964-65).
PROFESSOR OSBORNE

257. DESIGN OF FORESTRY EXPERIMENTS AND ANALYSIS OF DATA.—Role of experimental design in field and laboratory, and statistical analysis of data as aspects of the scientific method in forestry research. 5 s.h. (Not offered 1964-65).
PROFESSOR OSBORNE

261. FOREST SOILS.—Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalent; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 s.h. (fall).
ASSOCIATE PROFESSOR RALSTON

270. ECONOMICS OF FORESTRY.—Development of the principles of economics useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry basic and peculiar to forestry, with special attention to the time dimension of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 s.h. (fall). PROFESSOR YOHO

272. MARKETING FOREST PRODUCTS.—Methods of selling and distributing lumber, timber, and other important forest products in domestic and foreign trade; trade-association functions; regional competition for markets; and transportation problems. Prerequisites: Forestry 212 and 270 or equivalents. 2 s.h. (spring). PROFESSOR WACKERMAN

276. FOREST POLICY.—Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public and private forestry organizations, and current policy issues in the light of economic and other criteria. Prerequisite: Forestry 270. 2 s.h. (spring). PROFESSOR YOHO

281. FOREST MANAGEMENT.—Principles of organizing forest properties for

systematic management, use of data obtained in surveys and inventories; principles of forest regulation, including a study of normal and actual forests, rotations, cutting cycles, and methods of regulating the cut in even-aged and all-aged forests for sustained yield; introduction to the preparation of preliminary forest management plans. Prerequisites: Forestry 150, 151, or equivalents. 3 s.h. (spring). PROFESSOR CHAIKEN

283. FOREST PROTECTION.—Principles of forest protection; causes, character and effects of forest fires; principles of forest fire prevention, presuppression and suppression; fire control costs and fire plans; protection against domestic animals, wildlife, and atmospheric agencies. 2 s.h. (fall). PROFESSOR CHAIKEN

285. FOREST-GAME MANAGEMENT.—Principles of management for the sustained production of desirable game and fur animals on forest land; characteristics and biology of important species. 2 s.h. (spring). PROFESSOR ANDERSON

286. FOREST-RANGE MANAGEMENT.—Principles of livestock management by which sustained maximum use can be obtained from forest grazing lands. 2 s.h. (spring). PROFESSOR ANDERSON

290. WOOD ANATOMY.—Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Prerequisites: one year of biology including botany; Forestry 241 or equivalent. 3 s.h. (spring). ASSISTANT PROFESSOR SULLIVAN

291. WOOD-MOISTURE RELATIONS.—Physical principles underlying the response of wood to moisture and its removal; the concept of equilibrium moisture content. Principles and methods involved in drying lumber and other wood products as a step in preparing them for use. Prerequisites: Forestry 212, and 290 or equivalents. 2 s.h. (fall). PROFESSOR WACKERMAN

292. MICROTECHNIQUE OF WOODY TISSUE.—Preparation of wood for microscopic study including sectioning, staining, and mounting techniques; elementary photomicrography. Prerequisite: Forestry 290 or equivalent. 2 s.h. (fall). PROFESSOR HARRAR

293. WOOD PRESERVATION.—Principles, methods, and materials used in treating wood to increase its durability, service-life, and fire resistance. Prerequisites: Forestry 212 and 290, or equivalents. 2 s.h. (fall). PROFESSOR WACKERMAN

201A. TO 293A. SPECIAL STUDIES IN FORESTRY.—Work on the same level as the foregoing Senior-Graduate courses to meet the needs of individual students. Credit and hours to be arranged. THE STAFF

## FOR GRADUATES

301 (fall), 302 (spring). ADVANCED STUDIES IN FORESTRY.—Credits to be arranged. To meet individual needs of graduate students in the following branches of forestry:

A. SILVICS.—Prerequisites: Forestry 241, 243, and 244 or equivalents. ASSISTANT PROFESSOR WOODS

B. FOREST SOILS.—Prerequisite: Forestry 261 or equivalent. ASSOCIATE PROFESSOR RALSTON

C. SILVICULTURE.—Prerequisites: Forestry 244, 245, and 246 or equivalents. ASSISTANT PROFESSOR WOODS

D. FOREST MANAGEMENT.—Prerequisite: Forestry 281 or equivalent. PROFESSOR CHAIKEN

E. FOREST ECONOMICS.—Prerequisite: Forestry 270 or equivalent. PROFESSOR YOHO

F. PROPERTIES OF WOOD.—Prerequisites: Forestry 241, and 290 or equivalents. PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

G. FOREST MENSURATION AND BIOMETRY.—Prerequisites: Forestry 250, and 352 or equivalents. PROFESSOR OSBORNE

H. FOREST ENTOMOLOGY.—Prerequisite: Forestry 230 or equivalent. PROFESSOR ANDERSON

I. FOREST UTILIZATION.—Prerequisite: Forestry 212 or equivalent.
PROFESSOR WACKERMAN

J. DENDROLOGY.—Prerequisite: Forestry 241 or equivalent.
PROFESSOR HARRAR

K. FOREST-TREE PHYSIOLOGY.—Prerequisites: Plant physiology, plant ecology, and silvics. PROFESSOR KRAMER

L. FOREST PATHOLOGY.—Prerequisites: Plant physiology and Forestry 223 or equivalents. ASSISTANT PROFESSOR STAMBAUGH

M. FOREST CLIMATOLOGY AND HYDROLOGY.—Prerequisites: Forestry 341, 342, or equivalents. ASSISTANT PROFESSOR KNOERR

312. COST AND QUALITY CONTROLS IN FOREST UTILIZATION.—Principles and methods of obtaining greatest efficiency of operations and maximum product value in harvesting and processing forest products; factors governing the relation of tree size to net stumpage values; and the application of these principles and methods in the solution of actual case problems. Prerequisites: Forestry 212 and 270 or equivalent. 3 s.h. (spring). PROFESSOR WACKERMAN

321. RESEARCH TECHNIQUES IN FOREST PATHOLOGY.—Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223, or equivalent. 3 s.h. (fall).
ASSISTANT PROFESSOR STAMBAUGH

331. TOXICOLOGY OF INSECTICIDES.—Study of the physical, chemical and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisites: one course in entomology; organic chemistry is recommended. 3 s.h. (spring).
PROFESSOR ANDERSON

332. ECOLOGY OF FOREST INSECTS.—Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). PROFESSOR ANDERSON

333. MORPHOLOGY AND TAXONOMY OF FOREST INSECTS.—Principles of insect structure, classification and nomenclature; laboratory work concentrated on the collection, preservation and identification of both the adult and immature stages of various forest insects. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). PROFESSOR ANDERSON

341. FOREST METEOROLOGY.—The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (fall).
ASSISTANT PROFESSOR KNOERR

342. FOREST INFLUENCES.—The influence of forests and other vegetation on local climate, the hydrologic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (spring). ASSISTANT PROFESSOR KNOERR

344. MICROMETEOROLOGY.—Physics of the earth's surface environment with emphasis on plant and animal microclimate: budgets of mass, momentum and energy; vertical structure of wind, temperature, and water vapor in relation to exchange processes within the biosphere; local circulation and eddy diffusion. Principles in micrometeorological measurement. Prerequisites: Forestry 341; calculus desirable. 3 s.h. (spring). ASSISTANT PROFESSOR KNOERR

348. SEMINAR IN SILVICS.—Advanced topics in silvics are discussed and current research papers and reports are reviewed, analysed, and evaluated. Prerequisite: Forestry 244 or equivalent. 2 s.h. (spring). ASSISTANT PROFESSOR WOODS

352. ANALYSIS OF FOREST MEASUREMENTS.—Empirical equations and curve fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisite: Forestry 250 or Mathematics 233 or equivalents. 3 s.h. (spring). PROFESSOR OSBORNE

353. SAMPLING AND EXPERIMENTAL DESIGN IN FORESTRY.—Theory and application of selected sampling designs to forestry populations. Includes multi-stage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Math 234 (Sample Designs) and Math 244 (Design of Experiments). 3 s.h. (fall).
PROFESSOR OSBORNE

357. (fall), 358. (spring). RESEARCH IN FORESTRY.—Credits to be arranged. Students who have had adequate training may do research under direction of members of the Faculty in the branches of forestry indicated under courses 301, 302 with the same prerequisites as thereunder noted; each branch to bear the same letter designation as under courses 301 and 302. STAFF

362. FOREST SOIL PHYSICS.—Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 s.h. (spring). Offered in alternate years with Forestry 366 (not offered 1964-65).
ASSOCIATE PROFESSOR RALSTON

364. SOIL CLASSIFICATION AND MAPPING.—Classification of soils as natural bodies. Mapping of soils, land use classes and forest site classes; field study will be made of soils in either the coastal plain or mountains. Prerequisite: Forestry 261. 2 s.h. (spring). ASSOCIATE PROFESSOR RALSTON

366. FOREST SOIL FERTILITY.—The relationships of soil fertility factors in the growth of forest trees. Emphasis placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisite: Forestry 261; analytical chemistry is recommended. 3 s.h. (spring). Offered in alternate years with Forestry 362. ASSOCIATE PROFESSOR RALSTON

368. SOILS-SILVICULTURE-MANAGEMENT FIELD SEMINAR.—Approximately two weeks at spring camp studying soils, silviculture, and forest management in the coastal plain. Prerequisites: Forestry 244, 261, and 281 or equivalents. 2 s.h. (spring). PROFESSOR CHAIKEN, ASSOCIATE PROFESSOR RALSTON AND ASSISTANT PROFESSOR WOODS

378. SEMINAR IN FOREST ECONOMICS.—Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 s.h. (spring).
PROFESSOR YOHO

379. ECONOMIC ANALYSIS IN FORESTRY.—A critical exploration of static and dynamic economic theory including procedures in activity analysis applicable to forestry problems of resource allocation and production combinations, production location and timing; cost structure and asset control; uncertainty and expectations. Special attention to problems in formulating economic projections and forecasts relevant to forestry. Prerequisite: Forestry 270 or consent of instructor. 3 s.h. (fall). PROFESSOR YOHO

386. SEMINAR IN FOREST MANAGEMENT.—Examination and analysis of techniques employed in the management of industrial and public forests, particularly in the South; discussion of problems of large scale intensive forest management. Prerequisites: Forestry 244, 281, and 379 or equivalents. 2 s.h. (spring).
PROFESSOR CHAIKEN

394. WOOD FINISHES AND FINISHING.—Preparation of wood and wood surfaces for application of finish coatings; the physical and chemical properties of finishing materials; equipment and methods of application; overlays, decals, and printing; laboratory control and qualitative evaluation of finished surfaces; finishing characteristics of various species of wood. Prerequisites: Forestry 290, 397 or equivalents; 1 year of organic chemistry also desirable. 2 s.h. (spring).
ASSISTANT PROFESSOR SULLIVAN

395. BONDING OF WOOD.—Preparation of veneers and lumber for bonding; types and characteristics of modern adhesives used in the manufacture of plywood

and laminates; cold and hot pressing procedures; use of electronic heating; bag molding techniques; manufacture and properties of transmuted wood; inspection and testing procedures. Prerequisite: Forestry 290 or equivalent. 3 s.h. (spring).
ASSISTANT PROFESSOR SULLIVAN

396. CHEMISTRY OF WOOD.—A study of the chemical constituents of wood including cellulose and its derivatives, lignin and the lignin-cellulose bond, the hemicelluloses, and extractives; hydrogenation and hydrolysis of wood; cell wall chemistry. Prerequisites: Forestry 290 or equivalent, one course in college physics; organic chemistry desirable. 2 s.h. (fall). ASSISTANT PROFESSOR SULLIVAN

397. TIMBER PHYSICS.—The physical properties of wood in relation to electricity, heat, light, moisture, and sound; the mechanical properties of wood; influence of site, growth, and anatomy upon strength and quality of wood; standard timber testing procedures. Prerequisites: Forestry 290 or equivalent; one course in college physics; mathematics through calculus desirable. 2 s.h. (fall).
ASSISTANT PROFESSOR SULLIVAN

398. TROPICAL WOODS.—A study of the properties of various groups of tropical woods with particular emphasis upon those used in marine construction, and for lumber, plywood and furniture. Prerequisite: Forestry 290 or equivalent. 2 s.h. (spring). PROFESSOR HARRAR

399. FOREST PRODUCTS SEMINAR.—Examination and discussion of new and recent developments in the field of forest products. Prerequisites: Forestry 270, 290, 291, 293, 395, 397 or equivalents. 1 s.h. (spring) STAFF

## OTHER RELATED COURSES

A student in the School of Forestry, may, with the approval of the faculty of the School of Forestry and the Director of Graduate studies of the department concerned, include any of the following courses offered in the Graduate School of Arts and Sciences for which he has had adequate preparation. The student is referred to the *Bulletin* of the Graduate School of Arts and Sciences for the complete descriptive content of each course.

### BOTANY

Professor Louis E. Anderson, Director of Graduate Studies

| | S.H. |
|---|---|
| 202. Genetics | 4 |
| 203. Plant Cytology | 4 |
| 204. Advanced Plant Anatomy | 4 |
| 221. Introductory Mycology | 4 |
| 240. Plant Evolution | 3 |
| 252. Plant Metabolism | 4 |
| 254. Plant-Water Relations | 3 |
| 255. Advanced Taxonomy | 4 |
| 256. Community Analysis and Classification | 3 |
| 257. Principles of Plant Distribution | 3 |
| 258. Physiology of Growth and Development | 4 |
| 259. Environmental Measurements | 3 |
| 305. Vegetation of North America | 3 |

### CHEMISTRY

Professor C. K. Bradsher, Director of Graduate Studies

| | S.H. |
|---|---|
| 206. Elements of Theoretical Chemistry | 4 |
| 215. Advanced Inorganic Chemistry | 3 |
| 216. Nuclear Chemistry | 2 |
| 233. Instrumental Analysis | 2 |
| 234. Chemical Instrumentation | 2 |
| 251. Qualitative Organic Analysis | 2 or 3 |

252. Advanced Organic Preparations.. 2
261-262. Physical Chemistry ..... 8
303. Thermodynamics ..... 3
304. Physical Chemistry of Reactions ..... 3
341, 342. Advanced Organic Chemistry ..... 8
350. Organic Reactions ..... 2
352. Mechanisms of Organic Reactions ..... 1
360. Polymer Chemistry ..... 2

## CIVIL ENGINEERING

Professor E. I. Brown, Director of Graduate Studies

| | S.H. |
|---|---|
| CE 201. Theoretical and Applied Mechanics | 3 |
| CE 202. Advanced Mechanics of Materials and Experimental Stress Analysis | 3 |
| CE 231. Structural Theory and Analysis | 3 |
| CE 242. Hydraulic Engineering | 3 |

## ECONOMICS AND BUSINESS ADMINISTRATION

Professor J. J. Spengler, Director of Graduate Studies

| | S.H. |
|---|---|
| 201. Senior Seminar in Economics | 3 |
| 204. Advanced Money and Banking | 3 |
| 218. Business Cycles | 3 |
| 219. Economic Problems of Underdeveloped Areas | 3 |
| 231. Economic History of Europe | 3 |
| 233. State and Local Finance | 3 |
| 237-238. Statistical Methods | 6 |
| 249. Product Markets | 3 |
| 262. Trade Unionism and Collective Bargaining | 3 |
| 268. Competition and Monopoly | 3 |
| 273-274. Auditing, Theory and Practice | 6 |
| 275-276. Advanced Industrial Accounting and Management | 6 |
| 277. Income Tax Accounting | 3 |
| 278. Advanced Problems in Income Taxation | 3 |
| 279. Budgeting and Control | 3 |
| 287. Public Finance | 3 |
| 290. The Use of Quantitative Methods in Business | 3 |
| 291. Business Policy | 3 |
| 293. Economic Systems | 3 |
| 294. Economic Functions of the State | 3 |
| 295-296. Advanced Accounting Seminar—Theory and Practice | 6 |
| 301. Economic Analysis | 3 |
| 304-305. Seminar—Money and Banking | 6 |
| 307-308. Quantitative Analysis | 6 |
| 311-312. History of Political Economy | 6 |
| 313-314. Seminar—Economic Theory | 6 |
| 315. Seminar—Economic Systems | 3 |
| 316. Seminar—Economic Functions of the State | 3 |
| 317. Seminar—Demographic, Population, and Resource Problems | 3 |
| 319. Seminar—Theory and the Problems of Economic Growth and Change | 3 |
| 320. Seminar—Trade Cycles, Employment, and Income Theory | 3 |
| 321-322. Economic Workshop—Economic Development | 6 |
| 329. Federal Finance | 3 |
| 330. Seminar—Public Finance | 3 |
| 331. Seminar—Economic History | 3 |
| 340. National Income | 3 |
| 355. Seminar—Labor Economics | 3 |
| 358. Seminar—Labor Market and Related Analysis | 3 |
| 365. Seminar—International Economics | 3 |
| 366. Seminar—Problems in International Trade and Finance | 3 |
| 386. Seminar—Latin American Economic Problems | 3 |
| 388. Seminar—Industrial Organization | 3 |
| 389. Seminar—Industrial and Governmental Problems | 3 |
| 401. Seminar—British Commonwealth | 3 |

## ELECTRICAL ENGINEERING

Professor C. R. Vail, Director of Graduate Studies

| | S.H. |
|---|---|
| EE 201. Energy Systems | 3 |

## MATHEMATICS

Associate Professor S. L. Warner, Director of Graduate Studies

| | S.H. |
|---|---|
| 211. Finite Mathematics | 3 |
| 212. Mathematical Analysis | 3 |
| 221. Digital Computer | 3 |
| 222. Introduction to Numerical Analysis | 3 |
| 233. Statistical Methods | 3 |
| 234. Sampling Designs | 3 |
| 244. Design of Experiments | 3 |
| 283. Probability for Engineers | 3 |
| 285. Applied Mathematical Methods I | 3 |
| 286. Applied Mathematical Methods II | 3 |
| 291-292. Theory of Functions | 6 |
| 325-326. Real Variable | 6 |

## MECHANICAL ENGINEERING

Professor J. N. MacDuff, Director of Graduate Studies

| | S.H. |
|---|---|
| ME 201. Theoretical and Applied Mechanics | 3 |
| ME 202. Theoretical Thermodynamics | 3 |
| ME 222. Analysis of Heat Transfer | 3 |

## PHILOSOPHY

Professor Barnard Peach, Director of Graduate Studies

| | S.H. |
|---|---|
| 241. Logic | 3 |

## PHYSICS

Professor Lawrence Biedenharn, Director of Graduate Studies

| | S.H. |
|---|---|
| 201-202. Mechanics | 6 |
| 213-214. Contemporary Physics | 6 |
| 217-218. Advanced Physics Laboratory | 2-6 |
| 303-304. Thermodynamics and Statistical Mechanics | 6 |
| 340. Structure of Matter | 3 |

## POLITICAL SCIENCE

Professor R. R. Wilson, Director of Graduate Studies

| | S.H. |
|---|---|
| 207. American Constitutional Law and Theory | 3 |
| 241. Administrative Management | 3 |

## SOCIOLOGY

Associate Professor A. C. Kerchkoff, Director of Graduate Studies

| | S.H |
|---|---|
| 233. Rural Sociology | 3 |
| 246. Public Opinion and Propaganda | 3 |
| 248. Pressure Groups and Public Relations | 3 |

## ZOOLOGY

Associate Professor D. A. Livingstone, Director of Graduate Studies

| | S.H. |
|---|---|
| 203. Ecology | 4 |
| 222. Entomology | 4 |
| 238. Systematic Zoology | 4 |
| 245. Radiation Biology | 3 or 4 |
| 246. Molecular Biology | 3 or 4 |
| 249. Neural and Hormonal Mechanisms in Invertebrates | 4 |
| 271. Cellular Physiology | 4 |
| 274. Invertebrate Zoology | 4 |
| 276. Protozology | 4 |
| 278. Invertebrate embryology | 4 |

# Cooperative Plan of Study with Selected Colleges and Universities

SINCE its inception the Duke School of Forestry has had the cooperation of Trinity College (the men's undergraduate college of arts and sciences of Duke University) in preparing students for professional careers in forestry. Under the plan, a student devotes his first three years to a coordinated and carefully integrated program of study in the basic arts and sciences in Trinity College. The summer between his junior and senior year and the two following school years are spent in the School of Forestry. Upon the successful completion of this five-year course of study, a student will have earned the Bachelor of Science degree from Trinity College and the professional Master of Forestry degree from the Duke School of Forestry.

Based upon the experience and success of this cooperative program with Trinity College, the School of Forestry in 1952 initiated similar programs of collaboration with a selected group of colleges and universities located throughout the United States. These programs offer students the numerous advantages of a broad background in liberal arts and sciences as preparation for later professional training. A student intent upon following such a course of study should make application to one of the colleges listed on pages 41-43. Admission requirements and other information pertinent to matriculation may be obtained from each of these institutions. Not later than the end of the first semester of the third year in the college or university of his choice, the student may make formal application for admission to the Duke School of Forestry. To qualify for admission under these programs, a student must have followed a planned course of study arranged in consultation with his advisor, must have the official recommendation of his college, and must meet the minimum requirements for admission to the Duke School of Forestry.

## *Institutions Cooperating with the School of Forestry in the Academic-Forestry Program*

**ALABAMA**

**Howard College** ..... **Birmingham 6**

**COLORADO**

**Colorado College** ..... **Colorado Springs**

FLORIDA

Florida Southern College.....Lakeland
Rollins College.....Winter Park
Stetson University, College of Liberal Arts.....DeLand

ILLINOIS

Illinois Wesleyan University, College of Liberal Arts.....Bloomington

INDIANA

Butler University, College of Liberal Arts and Sciences.....Indianapolis 7
DePauw University, College of Liberal Arts.....Greencastle
Indiana Central College.....Indianapolis 27

IOWA

Iowa Wesleyan College.....Mount Pleasant

KANSAS

Baker University.....Baldwin

KENTUCKY

Centre College of Kentucky.....Danville
Kentucky, University of, College of Arts and Sciences.....Lexington

LOUISIANA

Centenary College of Louisiana.....Shreveport

MARYLAND

Western Maryland College.....Westminster

MICHIGAN

Albion College.....Albion

MISSISSIPPI

Millsaps College.....Jackson

MISSOURI

William Jewell College.....Liberty

NEBRASKA

Doane College.....Crete

NEW JERSEY

Drew University, College of Liberal Arts.....Madison

NEW YORK

Hofstra College.....Hempstead, Long Island

NORTH CAROLINA

Catawba College.....Salisbury
Duke University, Trinity College.....Durham
Guilford College.....Guilford College
High Point College.....High Point
Wake Forest College.....Winston-Salem

OHIO

Baldwin-Wallace College.....Berea
Capital University, College of Arts and Sciences.....Columbus 9
Denison University, A College of Liberal Arts and Sciences.....Granville
Heidelberg College.....Tiffin
Kent State University, College of Liberal Arts.....Kent
Marietta College.....Marietta
Miami University, College of Arts and Sciences.....Oxford

Ohio University.....Athens
Otterbein College.....Westerville
Wittenberg College.....Springfield

OREGON

Reed College.....Portland 2
Willamette University, College of Liberal Arts.....Salem

PENNSYLVANIA

Albright College.....Reading
Elizabethtown College.....Elizabethtown
Franklin and Marshall College.....Lancaster
Gettysburg College.....Gettysburg
Juniata College.....Huntingdon
Lebanon Valley College.....Annville
Lycoming College.....Williamsport
Moravian College.....Bethlehem
Muhlenberg College.....Allentown
Thiel College.....Greenville

SOUTH CAROLINA

Furman University.....Greenville
Newberry College.....Newberry
Wofford College.....Spartanburg

TENNESSEE

Carson-Newman College.....Jefferson City
Chattanooga, University of, College of Liberal Arts.....Chattanooga 3
East Tennessee State College.....Johnson City
Lincoln Memorial University.....Harrogate
Tennessee Wesleyan College.....Athens
Tusculum College.....Greenville

TEXAS

Baylor University, College of Arts and Sciences.....Waco
Southwestern University, College of Arts and Sciences.....Georgetown

VIRGINIA

Bridgewater College.....Bridgewater
Randolph-Macon College.....Ashland
Richmond, University of, Richmond College.....Richmond
William and Mary, College of.....Williamsburg

WEST VIRGINIA

Davis and Elkins College.....Elkins
Marshall College.....Huntington
West Virginia Wesleyan College.....Buckhannon

WISCONSIN

Beloit College.....Beloit

# Enrollment 1963-1964

## *Registered for the Master of Forestry Degree, 1964*

Boardwine, Robert Wayne (Lincoln Memorial University), Kingsport, Tenn.
Boyd, Wade Claybourne (B.S.F., Arkansas A. & M. College), Little Rock, Ark.
Brocard, Norman George (B.S., Rutgers University; M.F., University of Washington), Church Creek, Md.
Bullock, Henry Carruth (East Tennessee State College), Kingsport, Tenn.
Cleaveland, John Adams (B.S., Duke University), New Hartford, N.Y.
Cordell, Charles Edward (B.S., North Carolina State College), Durham, N.C.
DeBell, Dean Shaffer (Juniata College), Gloucester, N.J.
Flavell, Thomas Hardie (Marietta College), Fair Lawn, N.J.
Heuple, Harry Clifford (Marietta College), Pittsburgh, Pa.
Hodge, Frederick Augustus (B.S., Gonzaga University), San Diego, Calif.
Hunt, William Cook (B.S., Auburn University), Kingstree, S.C.
Jones, Barry Crisman (B.S., Louisiana State University), Hamburg, Ark.
Kaufmann, Merrill Ray (B.S., University of Illinois), Buckley, Ill.
Kohlhepp, Virgil Norman (Gettysburg College), DuBois, Pa.
Lucas, John Thomas (B.S.F., West Virginia University), Shepherdstown, W. Va.
Meyers, James Robert (Davis and Elkins College), Hialeah, Fla.
Mussell, Harry Wilkie (Drew University), Pompton Lakes, N.J.
Nichols, Kenwood Curtis (B.S., Auburn University), Selma, Ala.
O'Neal, Thomas Denny (B.S., Southern Illinois University), Bloomington, Ind.
Prosser, Stanley Carl (Gettysburg College), Gettysburg, Pa.
Rewalt, Louis James (B.S., Rutgers University), Haddon Heights, N.J.
Shaw, Bartow Solomon, Jr. (B.S., Clemson College), Sumter, S.C.
Shepard, Robert Kent, Jr. (B.S.. University of Michigan), Metuchen, N.J.
Stuart, William Berton (B.S., Pennsylvania State University), Falls Creek, Pa.
Tarumingkeng, Rudolf Christiaan (University of Indonesia), Bogar, Indonesia
Tellman, Stephen James (Albion College), North Olmstead, Ohio.
Wenderoth, John Henry (B.S., Pennsylvania State University), Baltimore, Md.
Wolfe, Robert Dale (Thiel College), Pittsburgh, Pa.

## *Registered for the Master of Forestry Degree, 1965*

Bogardus, Burl Paul (University of Kentucky), Pikeville, Ky.
Brown, Howard Daniel (A.B., David Lipscomb College), White Bluff, Tenn.
Curtis, Luke (Duke University), Ossining, N.Y.
Ellsworth, Wendell Eugene (B.S., Michigan State University), Belding, Mich.
Fultz. Marvin Clark (William Jewell College), Durham, N.C.
Ireland, William Louis (A.B., Harvard University), Durham, N.C.
Kindred, Phillip Camel (Carson-Newman College), Harriman, Tenn.
McDonald, Peter Garwood (A.B., Brown University), Portland, Ore.
Mignot, Edward Charles (Albion College), Roanoke, Ind.
Monahan, Ralph Thomas, Jr. (Gettysburg College), Rockville, Md.
Seale, Richard Creighton (Denison University), Babylon, N.Y.
Wartluft, Jeffrey Lee (Thiel College), Chalfort, Pa.
Weirich, Robert Neil (Elizabethtown College), Jonestown, Pa.
Wenrich, John Pierce (College of William and Mary), Disputanta, Va.
West, Joseph Woodford, Jr. (B.S., Duke University), Clarks Summit, Pa.
Woolwine, Phil C. (B.S., University of Idaho), Enid, Okla.

## *Registered for the Doctor of Forestry Degree*

Anderson, Neil Hamilton (B.S.; M.S., Clemson College), Durham, N.C.

Barnard, Joseph Ewing (B.S.; M.S., Pennsylvania State University), Chester, Pa.

Barnett, James Preston (B.S.; M.F., Louisiana State University), Mena, Ark.

Belt, George Harley, Jr. (B.S., North Carolina State College; M.F., Yale University), Hyattsville, Md.

Bonner, Franklin Thomson (B.S.F., Louisiana State University; M.F., Duke University), Memphis, Tenn.

Box, Benton Holcomb (B.S.; M.F., Louisiana State University), Bogalusa, La.

Brown, James Henry, Jr. (B.S., University of Connecticut; M.S., University of Rhode Island), Oneco, Conn.

Buckingham, Forrest Morgan (B.S., University of New Brunswick; M.F., Harvard University), Ontario, Canada

DeBrunner, Louis Earl (B.S., University of Cincinnati; M.F., Yale University), Auburn, Ala.

Douglass, Ross Swarens (B.S., North Carolina State College; M.F., Duke University), Raleigh, N.C.

Foil, Robert Rodney (B.S.; M.F., Louisiana State University), Homer, La.

Gray, John Lewis (B.S.F., Pennsylvania State University; M.F., Yale University), Gainesville, Fla.

Holt, William Robert (B.S.F.; M.S., Pennsylvania State University), Philadelphia, Pa.

Lin, Jim Yung-huan (B.A., Taiwan; M.S., North Carolina State College), Taiwan, China

Lund, Anders Edward (B.S., Colorado State University; M.F., Duke University), Verona, Pa.

Moehring, David Marion (B.S.F., Montana State University; M.F., Duke University), Crossett, Ark.

Muench, John, Jr. (B.S.F.; M.S., Pennsylvania State University), Chambersburg, Pa.

Parker, John Reid (B.S.F., University of Georgia; M.F., Duke University), Athens, Ga.

Ronco, Frank, Jr. (B.S.; M.S., Colorado State University), Ft. Collins, Colo.

Strickler, Melvin Dee (B.S.F., Washington State University; M.S., State University College of Forestry at Syracuse University), Clarkston, Wash.

Thomas, Richard Joseph (B.S., Pennsylvania State University; M.S., North Carolina State College), Cary, N. C.

Thompson, William Payne (A.B.; M.F., Yale University), Flagstaff, Ariz.

Towers, Barry (B.A., Thiel College; M.F., Duke University), Houston, Tex.

Wahlgren, Harold Emil (B.S.; M.S., Iowa State University), Madison, Wisc.

Wells, Garland Ray (B.S.F., Louisiana Polytechnic Institute; M.F., North Carolina State College), Ruston, La.

Yelenosky, George (B.S.; M.F., Pennsylvania State University), Vintondale, Pa.

## *Students in Summer Session Only, 1963*

Lentz, John L. (Duke University), Ellerbe, N.C.

## *Students of Forestry in the Graduate School of Arts and Sciences*

Fasick, Clyde Augustus (B.S.F., University of the South; M.F., Duke University), Winchester, Tenn.

Foster, Bennett Bert (B.S., Colorado State University; M.F., Oregon State University), Durham, N.C.

Gay, Lloyd Wesley (B.S., Colorado State University; Diploma of Forestry, Australian Forestry School; M.F., Duke University), Durham, N.C.

Hutnik, Russell James (B.S.F., Pennsylvania State University; M.F., Yale University), Shickshinny, Pa.

Miller, Lee Norman (B.B.A., Southern Methodist University; M.F., Yale University), Decatur, Ill.

Neumann, Francis Phillip (B.S., Pennsylvania State University; M.S., University of Minnesota), Stevenson, Md.

Rosenthal, Gerald Asad (B.S., State University College of Forestry at Syracuse University; M.F., Duke University), Brookline, Mass.

Schell, Kerry Franklin (B.S.F.; M.S., Pennsylvania State University), Pine Grove Mills, Pa.

Schultz, Robert Paul (B.S., Michigan State University; M.F., Oregon State University), L'Anse, Mich.

Steensen, Donald H. J. (B.S.F., Iowa State University; M.F., Duke University), Auburn, Ala.

Stubbs, Jack (B.S., Michigan State University; M.F., University of Minnesota), Keego Harbor, Mich.

Wellons, Jesse Davis, III (B.S.; M.F., Duke University), Durham, N.C.

## *Institutions Represented*

| | |
|---|---|
| Albion College | 2 |
| Arkansas A & M College | 1 |
| Auburn University | 2 |
| Australian Forestry School | 1 |
| Brown University | 1 |
| Carson-Newman College | 1 |
| Clemson College | 2 |
| College of William and Mary | 1 |
| Colorado State University | 4 |
| David Lipscomb College | 1 |
| Davis and Elkins College | 1 |
| Denison University | 1 |
| Drew University | 1 |
| Duke University | 15 |
| East Tennessee State College | 1 |
| Elizabethtown College | 1 |
| Gettysburg College | 3 |
| Gonzaga University | 1 |
| Harvard University | 2 |
| Iowa State University | 2 |
| Juniata College | 1 |
| Lincoln Memorial University | 1 |
| Louisiana Polytechnic Institute | 1 |
| Louisiana State University | 5 |
| Marietta College | 2 |
| Michigan State University | 3 |
| Montana State University | 1 |
| North Carolina State College | 6 |
| Oregon State University | 2 |
| Pennsylvania State University | 11 |
| Rutgers University | 2 |
| Southern Illinois University | 1 |
| Southern Methodist University | 1 |
| State University College of Forestry at Syracuse University | 2 |
| Tiawan Provincial Chung Hsing University | 1 |
| Thiel College | 3 |
| University of Cincinnati | 1 |
| University of Connecticut | 1 |
| University of Georgia | 1 |
| University of Idaho | 1 |
| University of Illinois | 1 |
| University of Indonesia | 1 |
| University of Kentucky | 1 |
| University of Maine | 1 |
| University of Michigan | 1 |
| University of Minnesota | 2 |
| University of New Brunswick | 1 |
| University of Rhode Island | 1 |
| University of the South | 1 |
| University of Washington | 1 |
| Washington State University | 1 |
| West Virginia University | 1 |
| William Jewell College | 1 |
| Yale University | 7 |
| Total | 54 |

## *Geographical Distribution*

### UNITED STATES

| | |
|---|---|
| Alabama | 3 |
| Arizona | 1 |
| Arkansas | 4 |
| California | 1 |
| Colorado | 1 |
| Connecticut | 1 |
| Florida | 2 |
| Georgia | 1 |
| Indiana | 2 |
| Illinois | 3 |
| Kentucky | 1 |
| Louisiana | 3 |
| Maryland | 5 |
| Massachusetts | 1 |
| Michigan | 3 |
| New Jersey | 5 |
| New York | 3 |
| North Carolina | 10 |
| Ohio | 1 |
| Oklahoma | 1 |
| Oregon | 1 |
| Pennsylvania | 15 |
| South Carolina | 2 |
| Tennessee | 6 |
| Texas | 1 |
| Virginia | 1 |
| Washington | 1 |
| West Virginia | 1 |
| Wisconsin | 1 |
| Total States | 29 |

### FOREIGN COUNTRIES

| | |
|---|---|
| Canada | 1 |
| China | 1 |
| Indonesia | 1 |
| Total | 3 |

## *General Summary*

| | |
|---|---|
| Students in the School of Forestry | 71 |
| Students in Summer Session Only | 1 |
| Students of Forestry in the Graduate School of Arts and Sciences | 12 |
| Total Enrollment | 84 |
| Total Number of Institutions Represented | 54 |
| Total Number of States Represented | 29 |
| Total Number of Foreign Countries Represented | 3 |

# BULLETIN
## OF
# DUKE UNIVERSITY




# The Graduate School of Arts and Sciences

## CATALOGUE FOR 1964-65

NOTE: EACH APPLICATION, EXCEPT FROM A FOREIGN OR NON-DEGREE STUDENT, FOR ADMISSION IN SEPTEMBER 1965 AND THEREAFTER WHICH IS RECEIVED AFTER OCTOBER 1, 1964, MUST BE ACCOMPANIED BY A NON-REFUNDABLE FEE OF FIVE DOLLARS IN CHECK OR MONEY ORDER PAYABLE TO DUKE UNIVERSITY, NOT IN CASH.

VOLUME 36 February, 1964 NUMBER 4-B

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of The College of Engineering, apply to *The Registrar,* Duke University, Durham, N. C.

For Bulletin of The Divinity School, apply to *The Dean of the Divinity School,* Duke University, Durham, N. C.

For Bulletin of The School of Forestry, apply to *The Dean of the School of Forestry,* Duke University, Durham, N. C.

For Bulletin of The Graduate School of Arts and Sciences, apply to *The Dean of the Graduate School,* Duke University, Durham, N. C.

For Bulletin of The School of Law, apply to *The Dean of the School of Law,* Duke University, Durham, N. C.

For Bulletin of The School of Medicine, apply to *The Dean of the School of Medicine,* Duke University, Durham, N. C.

For Bulletin of The School of Nursing, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C.

For Bulletin of The Summer Session, apply to *The Director of the Summer Session,* Duke University, Durham, N. C.

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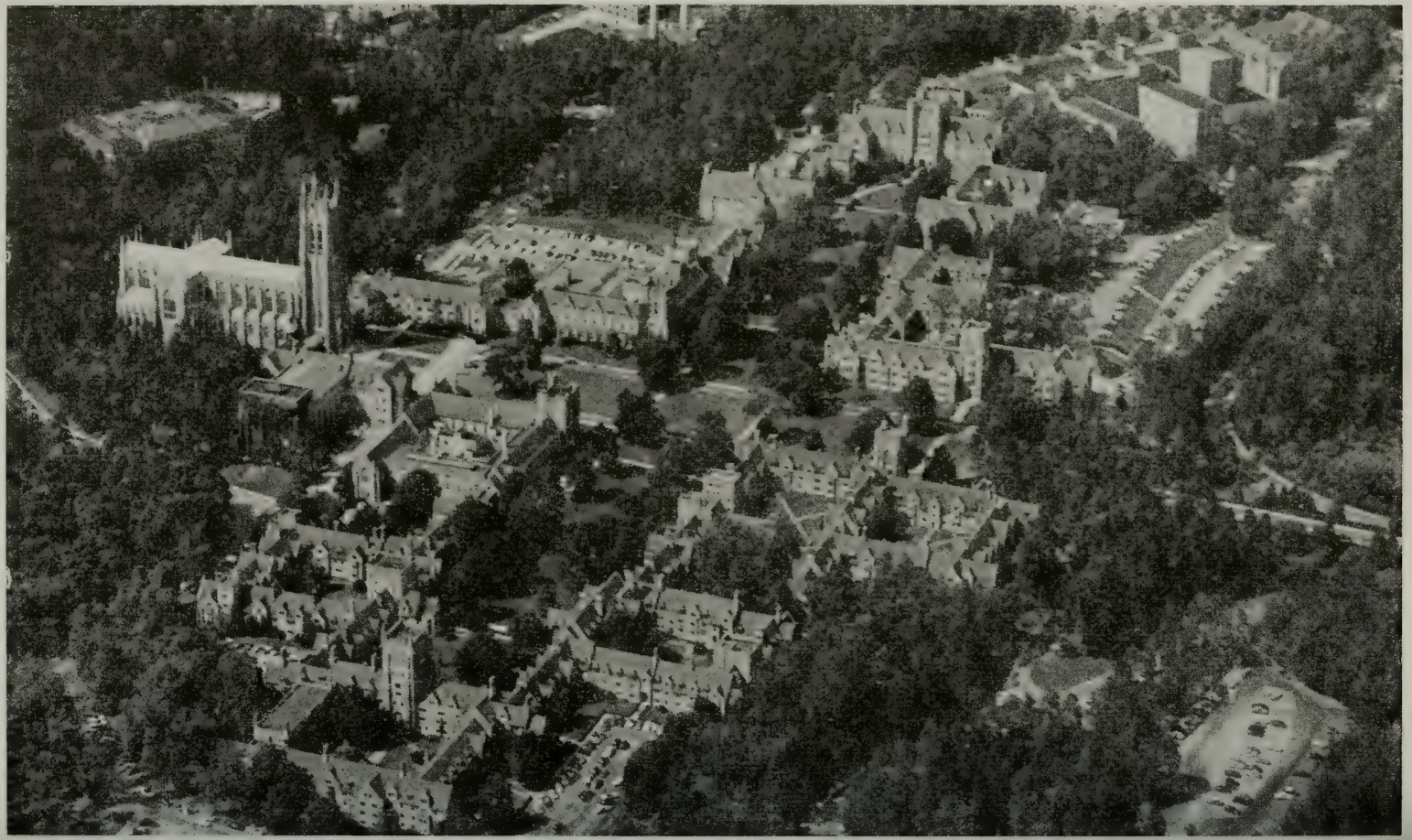
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

# BULLETIN
OF
# DUKE UNIVERSITY

THE GRADUATE SCHOOL
OF ARTS AND SCIENCES

1963-64
CATALOGUE FOR 1964-1965

DURHAM, NORTH CAROLINA
1964



DUKE UNIVERSITY: WEST CAMPUS WITH DUKE FOREST IN BACKGROUND

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# Calendar of the Graduate School

## *Summer Session 1964*

1964

| | | |
|---|---|---|
| April | 13-15 | Advance registration for current students for 1964 Summer Session (and for fall semester 1964). |
| June | 9 | Tuesday—Registration of students for Summer Session, first term. |
| June | 10 | Wednesday—Instruction begins for Summer Session, first term. |
| June | 24 | Wednesday—Final date for filing with the Graduate Office Statement of Intention to complete, during the first term, requirements for the Master's degree. If a thesis is to be presented, the title is to be filed at the same time as the Statement of Intention. |
| July | 1 | Wednesday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., 233 Allen Building. Candidates register in the Graduate School Office not later than June 26. |
| July | 6-10 | German examination for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than June 25. |
| July | 15 | Wednesday—First term of Summer Session ends. |
| July | 16 | Thursday—Registration of students for second term of Summer Session. |
| July | 17 | Friday—Instruction begins for second term of Summer Session. |
| July | 24 | Friday—Final date for filing with the Graduate Office Statement of Intention to complete, during the second term, requirements for the Master's degree. If a thesis is to be presented, the title is to be filed at the same time as the Statement of Intention. |
| Aug. | 21 | Friday—Second term of Summer Session ends. |

## *Academic Year 1964-65*

| | | |
|---|---|---|
| Sept. | 21 | Monday—Reading, Vocabulary and Grammar Tests in French, Spanish, and German: French and Spanish 9:00 A.M., German 10:15 A.M., both in 125 Engineering Building. (See page 00 for information.) English Tests for Foreign Students: 2:00 P.M., 125 Engineering Building.<br>Consultation with Directors of Graduate Study concerning course program. |
| Sept. | 22 | Tuesday—Approval of course program and arrangement of fees for all new and non-pre-registered returning students. Graduate School Office, 127 Allen, 9-12; 2-3:30 P.M. |
| Sept. | 23 | Wednesday—Registration of graduate students for first semester. Indoor Stadium. |
| Sept. | 24 | Thursday—Classes begin. |
| Sept. | 28 | Monday—French and Spanish examination for candidates for graduate degrees, 4:00 P.M., Room 125 Engineering Building. Candidates register in the Graduate School Office for these examinations not later than September 2. |
| Oct. | 12-16 | German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than October 2. |

Nov. 25 Wednesday, 12:30 P.M.—Thanksgiving recess begins.
Nov. 30 Monday, 8:00 A.M.—Classes are resumed.
Dec. 11 Friday—Founders Day.
Dec. 19 Saturday, 12:30 P.M.—Christmas recess begins.

1965

Jan. 4 Monday, 8:00 A.M.—Classes are resumed.
Jan. 8 Friday—French and Spanish examination for candidates for graduate degrees, 4:00 P.M., place to be announced. Candidates register in the Graduate School Office for these examinations not later than December 19, 1964.
Jan. 11-18 Reading period.
Jan. 19 Tuesday—Final examinations begin.
Jan. 29 Friday—Final examinations end.
Feb. 1 Monday—Reading, Vocabulary and Grammar Tests in French, Spanish and German for entering students, second semester. French and Spanish 10:30 A.M., German, 11:45 A.M., both in 125 Engineering Building. (See page 25 for information.)
Feb. 3 Wednesday—Registration for students not in residence during first semester and for current students who failed to pre-register. Indoor Stadium.
Feb. 4 Thursday—Classes are resumed.
Feb. 15 Last day for applying for University fellowships, graduate assistantships, and graduate scholarships.
March 1 Final date for filing with Graduate Office Statement of Intention of receiving advanced degree in June. Titles of theses and dissertations are to be filed concurrently with the Statement of Intention.
March 27 Saturday, 5:00 P.M.—Spring recess begins.
April 5 Monday, 8:00 A.M.—Classes are resumed.
April 9 Friday—French and Spanish examinations for candidates for graduate degrees, 4:00 P.M., place to be announced. Candidates register in the Graduate School Office for these examinations not later than March 26.
April 15 Thursday—Last day for submitting theses for degrees of Doctor of Philosophy and Doctor of Education.
May 1 Saturday—Last day for submitting theses for degrees of Master of Arts, Master of Science, Master of Education, and Master of Arts in Teaching.
May 3-7 German examinations for candidates for graduate degrees. Candidates register in the Graduate School Office for these examinations not later than April 23.
May 14-21 Reading period.
May 22 Saturday—Final examinations begin.
June 2 Wednesday—Final examinations end.
June 5 Saturday—Commencement begins.
June 6 Sunday—Commencement sermon.
June 7 Monday—Graduating Exercises.

LAST DATES FOR APPLYING FOR ADMISSION

Fall Semester, with Award ..... February 15
Fall Semester, Admission Only ..... August 1
Spring Semester ..... January 1
Summer Session, First Term ..... May 9
Summer Session, Second Term ..... June 16

# 1964

### JULY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
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| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

### AUGUST

| S | M | T | W | T | F | S |
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### SEPTEMBER

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### OCTOBER

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### NOVEMBER

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|---|---|---|---|---|---|---|
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| 29 | 30 | | | | | |

### DECEMBER

| S | M | T | W | T | F | S |
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| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

# 1965

### JANUARY

| S | M | T | W | T | F | S |
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| 31 | | | | | | |

### FEBRUARY

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | | | | | | |

### MARCH

| S | M | T | W | T | F | S |
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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

### APRIL

| S | M | T | W | T | F | S |
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| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | |

### MAY

| S | M | T | W | T | F | S |
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### JUNE

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### JULY

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| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
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### AUGUST

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
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| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

### SEPTEMBER

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| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

### OCTOBER

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| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

### NOVEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

### DECEMBER

| S | M | T | W | T | F | S |
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| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

# Officers of the University Administration

Douglas Maitland Knight, Ph.D., LL.D., Litt.D., *President of the University*
Robert Taylor Cole, Ph.D., *Provost*
Gerhard Chester Henricksen, M.A., C.P.A., *Vice President for Business and Finance*
*Treasurer*
Everett Harold Hopkins, M.A., LL.D., *Vice President for Planning and Institutional Studies*
*Assistant Provost*
Frank Leon Ashmore, A.B., *Vice President for Institutional Planning*
Charles Edward Jordan, A.B., LL.D., *Vice President for University Relations*
Herbert James Herring, M.A., LL.D., *Vice President for Student Life*
Frank Traver deVyver, Ph.D., *Vice Provost*
Harold Walter Lewis, Ph.D., *Vice Provost, Dean of Arts and Sciences*
Barnes Woodhall, M.D., *Vice Provost, Dean of the Medical School*
Benjamin Edward Powell, Ph.D., *Librarian*
Richard Lovejoy Tuthill, Ed.D., *University Registrar*
Craufurd David Goodwin, Ph.D., *Secretary*
Edwin Constant Bryson, LL.B., *University Counsel*

## *Graduate School Administration*

Richard Lionel Predmore, D.M.L., *Dean of the Graduate School of Arts and Sciences*
Francis Ezra Bowman, Ph.D., *Secretary of the Graduate Faculty, Assistant Dean and Director of Admissions, Graduate School of Arts and Sciences*
Charles Alan Boneau, Ph.D., *Assistant to the Dean*

### EXECUTIVE COMMITTEE OF THE GRADUATE FACULTY

Lewis E. Anderson*
Charles A. Baylis*
Francis E. Bowman
Richard L. Predmore
Robert S. Smith
Lionel Stevenson
Daniel C. Tosteson
Robert R. Wilson*

* Term ends September, 1964.

# Instructional Staff



## MEMBERS OF THE GRADUATE SCHOOL FACULTY

(as of November 21, 1963)

*The date denotes the first year of service at Duke University*

Frances Dorothy Acomb, (1945) Ph.D., *Associate Professor of History*
Donald Keith Adams, (1931) Ph.D., *Professor of Psychology*
John Richard Alden, (1955) Ph.D., *James B. Duke Professor of History*
Irving Alexander, (1963) Ph.D., *Professor of Psychology*
***John C. Altrocchi, (1957) Ph.D., *Assistant Professor of Psychology*
D. Bernhard Amos, (1962) M.D., *Professor of Immunology*
*Hugh Anderson, (1957) Ph.D., *Professor of Biblical Criticism and Theology*
Lewis Edward Anderson, (1936) Ph.D., *Professor of Botany*
Roger Fabian Anderson, (1950) Ph.D., *Professor of Forest Entomology*
John Leslie Artley, (1955) D.Eng., *Associate Professor of Electrical Engineering*
Seymour Axelrod, (1958) Ph.D., *Lecturer in Psychology*
Kurt W. Back, (1959) Ph.D., *Professor of Sociology*
Joseph Randle Bailey, (1946) Ph.D., *Associate Professor of Zoology*
Frank Baker, (1960) Ph.D., *Associate Professor of Religion*
Katharine May Banham, (1946) Ph.D., *Associate Professor of Psychology*
Paull Franklin Baum, (1922) Ph.D., *James B. Duke Professor Emeritus of English*
Charles A. Baylis, (1952) Ph.D., *Professor of Philosophy*
William Waldo Beach, (1946) B.D., Ph.D., *Professor of Christian Ethics*
Joseph Willis Beard, (1937) M.D., *Associate Professor of Virology*
Roland Frederick Becker, (1951) Ph.D., *Associate Professor of Anatomy*
Burton Beers, (1962) Ph.D., *Visiting Associate Professor of History*
Frederick Bernheim, (1930) Ph.D., *Professor of Pharmacology*
Mrs. Mary L. C. Bernheim, (1930) Ph.D., *Associate Professor of Biochemistry*
Merle M. Bevington, (1942) Ph.D., *Professor of English*
††Philip R. Bevington, (1959) Ph.D., *Assistant Professor of Physics*
¶¶¶L. C. Biedenharn, Jr., (1961) Ph.D., *Professor of Physics*
Lucius Aurelius Bigelow, (1929) Ph.D., *Professor Emeritus of Chemistry*
William Dwight Billings, (1952) Ph.D., *Professor of Botany*
§Edward Georges Bilpuch, (1962) Ph.D., *Assistant Professor of Physics*
**Robert W. Binkley, (1957) Ph.D., *Assistant Professor of Philosophy*
Martin Lee Black, Jr., (1930) M.B.A., C.P.A., *Professor of Accounting*
Hugo Leander Blomquist, (1920) Ph.D., *Professor Emeritus of Botany*
J. J. Blum, (1962) Ph.D., *Associate Professor of Physiology*
Edward Claude Bolmeier, (1948) Ph.D., *Professor of Education*
Charles Alan Boneau, (1957) Ph.D., *Associate Professor of Psychology*

* Absent on Sabbatical Leave, Fall Semester, 1963.
** Absent on Sabbatical Leave, Spring Semester, 1964.
*** Absent on Sabbatical Leave, 1963-64.
†† Resigned August 31, 1963.
¶¶¶ Absent on Sabbatical Leave, 1964-65.
§ Absent on Leave, 1963-64.

***Cazlyn Green Bookout, (1935) Ph.D., *Professor of Zoology*
Lloyd J. Borstelmann, (1953) Ph.D., *Associate Professor of Psychology*
****Francis Ezra Bowman, (1945) Ph.D., *Professor of English*
*Benjamin Boyce, (1950) Ph.D., *Professor of English*
Thomas Allen Boyle, Jr., (1957) M.S. in M.E., *Associate Professor of Mechanical Engineering*
Charles Kilgo Bradsher, (1939) Ph.D., *Professor of Chemistry*
Ralph Braibanti, (1953) Ph.D., *Professor of Political Science*
Jack Brehm, (1958) Ph.D., *Associate Professor of Psychology*
Edgar H. Brooks, (1963) Ph.D., *Visiting Professor of Political Science*
Earl I. Brown, (1960) Ph.D., *Professor of Civil Engineering*
Frances Campbell Brown, (1931) Ph.D., *Professor of Chemistry*
Edward H. Bryan, (1960) Ph.D., *Associate Professor of Civil Engineering*
Marion R. Bryson, (1962) Ph.D., *Assistant Professor of Mathematics*
Louis J. Budd, (1952) Ph.D., *Associate Professor of English*
Donald S. Burdick, (1962) Ph.D., *Assistant Professor of Mathematics*
Robert M. Burger, (1962) Ph.D., *Adjunct Associate Professor of Electrical Engineering*
William S. Bush, (1962) Ph.D., *Assistant Professor of Romance Languages*
William Lawrence Byrne, (1954) Ph.D., *Assistant Professor of Biochemistry*
Leonard Carlitz, (1932) Ph.D., *Professor of Mathematics*
Robert C. Carson, (1960) Ph.D., *Assistant Professor of Psychology*
William H. Cartwright, (1951) Ph.D., *Professor of Education*
Juan R. Castellano, (1947) D.F.L., *Professor of Romance Languages*
Clifton C. Cherpack, (1958) Ph.D., *Professor of Romance Languages*
Benjamin Guy Childs, (1924) M.A., *Professor Emeritus of Education*
C. Manning Clark, (1963) Ph.D., *Visiting Professor of History*
Kenneth Willis Clark, (1931) Ph.D., *Professor of New Testament*
Romane Lewis Clark, (1953) Ph.D., *Associate Professor of Philosophy*
Sanford I. Cohen, (1957) M.D., *Assistant Professor of Psychology*
Robert Taylor Cole, (1935) Ph.D., *James B. Duke Professor of Political Science*
Joel G. Colton, (1947) Ph.D., *Professor of History*
Robert Merle Colver, (1953) Ed.D., *Associate Professor of Education*
Norman Francis Conant, (1935) Ph.D., *James B. Duke Professor of Microbiology*
Robert Howe Connery, (1949) Ph.D., *Professor of Political Science*
Thomas Howard Cordle, (1950) Ph.D., *Associate Professor of Romance Languages*
John Costlow, (1959) Ph.D., *Assistant Professor of Zoology*
Frederick A. G. Cowper, (1918) Ph.D., *Professor Emeritus of Romance Languages*
Robert I. Crane, (1961) Ph.D., *Professor of History*
William L. Culberson, (1955) Ph.D., *Assistant Professor of Botany*
***John Shelton Curtiss, (1945) Ph.D., *Professor of History*
Robert Earle Cushman, (1945) B.D., Ph.D., *Professor of Systematic Theology*
Bingham Dai, (1943) Ph.D., *Professor of Psychology*
Eugene A. Davidson, (1958) Ph.D., *Associate Professor of Biochemistry*
David G. Davies, (1961) Ph.D., *Associate Professor of Economics*
Calvin De Armand Davis, (1962) Ph.D., *Assistant Professor of History*
Gifford Davis, (1930) Ph.D., *Professor of Romance Languages*
Eugene Davis Day, (1962) Ph.D., *Associate Professor of Immunology*

* Absent on Sabbatical Leave, Fall Semester, 1963.
*** Absent on Sabbatical Leave, 1963-64.
**** Absent on Sabbatical Leave, March 15, 1964 to July 10, 1964.

Louis De Alessi, (1961) Ph.D., *Assistant Professor of Economics*
David W. Dean, (1961) Ph.D., *Assistant Professor of Mathematics*
Herbert Deinert, (1962) Ph.D., *Assistant Professor of German*
William E. DeTurk, (1955) Ph.D., *Assistant Professor of Physiology and Pharmacology*
Frank Traver de Vyver, (1935) Ph.D., *Professor of Economics*
Irving Diamond, (1958) Ph.D., *Professor of Psychology*
Neal Dow, (1934) Ph.D., *Professor of Romance Languages*
Francis George Dressel, (1929) Ph.D., *Professor of Mathematics*
Bernard Duffey, (1960) Ph.D., *Professor of English*
Kenneth Lindsay Duke, (1940) Ph.D., *Associate Professor of Anatomy*
Robert F. Durden, (1952) Ph.D., *Associate Professor of History*
George Sharp Eadie, (1930) Ph.D., *Professor Emeritus of Physiology and Pharmacology*
Howard Easley, (1930) Ph.D., *Associate Professor Emeritus of Education*
Newton Edwards, (1961) Ph.D., *Visiting Professor Emeritus of Education*
Carl Eisdorfer, (1956) Ph.D., *Lecturer in Psychology*
William Whitfield Elliott, (1925) Ph.D., *Professor of Mathematics*
***Ernest Elsevier, (1950) M.S. in M.E., *Associate Professor of Mechanical Engineering*
†††Stephen Enke, (1961) Ph.D., *Professor of Economics*
R. P. Erickson, (1961) Ph.D., *Assistant Professor of Psychology*
Lawrence Evans, (1963) Ph.D., *Assistant Professor of Physics*
Edwin Vaughan Evarts, (1961) M.D., *Associate Professor of Physiology*
John Wendell Everett, (1932) Ph.D., *Professor of Anatomy*
Henry A. Fairbank, (1961) Ph.D., *Professor of Physics*
§§§John Morton Fein, (1950) Ph.D., *Professor of Romance Languages*
Arthur Bowles Ferguson, (1939) Ph.D., *Professor of History*
Charles E. Ferguson, (1957) Ph.D., *Professor of Economics*
Oliver Ferguson (1957) Ph.D., *Associate Professor of English*
††††Donald J. Fluke, (1957) Ph.D., *Associate Professor of Zoology*
Earle Fowler, (1962) Ph.D., *Professor of Physics*
Charles H. Frenzel, (1955) A.B., *Professor of Hospital Administration*
Irwin Fridovich, (1958) Ph.D., *Assistant Professor of Biochemistry*
Mercedes Gaffron, (1958) M.D., Ph.D., *Associate Professor of Psychology*
Thomas M. Gallie, Jr., (1954-55; 1956) Ph.D., *Associate Professor of Mathematics*
††William Henry Gardner, Jr., (1953) M.Eng., *Associate Professor of Civil Engineering*
Ila Gehman, (1959) Ed.D., *Lecturer in Psychology*
W. Scott Gehman, Jr., (1954) Ph.D., *Associate Professor of Psychology in Education*
***John Jay Gergen, (1936) Ph.D., *Professor of Mathematics*
Hans Gerhard, (1959) Ph.D., *Associate Professor of Economics*
Allan H. Gilbert, (1920) Ph.D., *Professor Emeritus of English*
Donald G. Gillin, (1959) Ph.D., *Assistant Professor of History*
Sherwood Githens, (1962) Ph.D., *Professor of Science Education*
Clarence Gohdes, (1930) Ph.D., *James B. Duke Professor of English*
Craufurd Goodwin, (1962) Ph.D., *Assistant Professor of Economics*

*** Absent on Sabbatical Leave, 1963-64.
†† Resigned, August 31, 1963.
††† Resigned, February 28, 1963.
†††† Absent on Sabbatical Leave, Spring Semester, 1964 and Fall Semester, 1964.
§§§ Absent on Leave, Spring Semester, 1964.

Walter Gordy, (1946) Ph.D., LL.D., D.H.C., *James B. Duke Professor of Physics*
Richard Babson Grant, (1952) Ph.D., *Associate Professor of Romance Languages*
Irving Emery Gray, (1930) Ph.D., *Professor of Zoology*
Ronald C. Greene, (1958) Ph.D., *Assistant Professor of Biochemistry*
John R. Gregg, (1957) Ph.D., *Professor of Zoology*
Eugene Grueling, (1948) Ph.D., *Professor of Physics*
Thomas Alan Griffy, (1961) Ph.D., *Assistant Professor of Physics*
Egil Grislis, (1961) Ph.D., *Assistant Professor of Religion*
Paul Magnus Gross, (1919) Ph.D., *William Howell Pegram Professor of Chemistry*
Samson Gross, (1960) Ph.D., *Associate Professor of Microbiology*
Walter R. Guild, (1960) Ph.D., *Associate Professor of Biochemistry*
Norman Guttman, (1951) Ph.D., *Associate Professor of Psychology*
Frank Gregory Hall, (1926-42; 1945) Ph.D., *Professor of Physiology and Pharmacology*
Louise Hall, (1931) S.B.Arch., Ph.D., *Professor of Architecture*
John Hamilton Hallowell, (1942) Ph.D., *Professor of Political Science*
William Baskerville Hamilton, (1936) Ph.D., *Professor of History*
Philip Handler, (1939) Ph.D., *James B. Duke Professor of Biochemistry and Nutrition*
***Frank Allan Hanna, (1948) Ph.D., *Professor of Economics*
George Thomas Hargitt, (1930) Ph.D., Sc.D., *Professor Emeritus of Zoology*
Charles Morgan Harman, (1961) Ph.D., *Assistant Professor of Mechanical Engineering*
Ellwood Scott Harrar, (1936) Ph.D., *Professor of Wood Technology*
A. Brooks Harris, (1963) Ph.D., *Instructor of Physics*
Reese T. Harris, (1959) Ph.D., *Assistant Professor of Mathematics*
Charles Cleveland Hatley, (1917) Ph.D., *Professor Emeritus of Physics*
Charles Roy Hauser, (1929) Ph.D., *James B. Duke Professor of Chemistry*
Fritz Heider, (1962) Ph.D., *Visiting William Preston Few Professor of Psychology*
Simeon K. Heninger, (1955) Ph.D., *Associate Professor of English*
Stuart C. Henry, (1959) Ph.D., *Associate Professor of American Christianity*
Frederick Herzog, (1960) B.D., Th.M., Th.D., *Associate Professor of Systematic Theology*
Duncan Charteris Hetherington, (1930) Ph.D., M.D., *Professor of Anatomy*
David Hill, (1962) Ph.D., *Assistant Professor of Civil Engineering*
Douglas Greenwood Hill, (1931) Ph.D., *Professor of Chemistry*
R. L. Hill, (1962) Ph.D., *Associate Professor of Biochemistry*
Hans J. Hillerbrand, (1959) Ph.D., *Assistant Professor of Modern European Christianity*
Lowell A. Hinrichs, (1962) Ph.D., *Assistant Professor of Mathematics*
Marcus Edwin Hobbs, (1935) Ph.D., *Professor of Chemistry*
Irving B. Holley, Jr., (1947) Ph.D., *Professor of History*
Frederic B. M. Hollyday, (1959) Ph.D., *Assistant Professor of History*
**Calvin Bryce Hoover, (1925) Ph.D., Litt.D., *James B. Duke Professor of Economics*
Edward Charles Horn, (1946) Ph.D., *Professor of Zoology*
Paul Horowicz, (1961) Ph.D., *Associate Professor of Physiology*
Jay Broadus Hubbell, (1927) Ph.D., Litt.D., *Professor Emeritus of English*
Alexander Hull, (1962) Ph.D., *Assistant Professor of Romance Languages*
Wayland Elroy Hull, (1953) Ph.D., *Associate Professor of Physiology*

** Absent on Sabbatical Leave, Spring Semester, 1964.
*** Absent on Sabbatical Leave, 1963-64.

Harold J. Humm, (1954) Ph.D., *Associate Professor of Botany*
Mrs. Wanda Sanborn Hunter, (1947) Ph.D., *Associate Professor of Zoology*
***Allan S. Hurlburt, (1956) Ph.D., *Professor of Education*
Mary Huse, (1962) Ph.D., *Lecturer in Psychology*
William H. Irving, (1936) B.A., (Oxon.), Ph.D., *Professor Emeritus of English*
Howard Eikenberry Jensen, (1931) B.D., Ph.D., *Professor Emeritus of Sociology*
Bronislas de Leval Jezierski, (1958) Ph.D., *Associate Professor of Russian Language and Literature*
Terry W. Johnson, Jr., (1954) Ph.D., *Associate Professor of Botany*
§Edward Ellsworth Jones, (1953) Ph.D., *Professor of Psychology*
Leon Lloyd Jones, (1963) Ph.D., *Assistant Professor of Chemistry*
Lyle E. Jones, (1961) Ph.D., *Visiting Professor in Psychology*
Brady Rimbey Jordan, (1927) Ph.D., *Professor Emeritus of Romance Languages*
Henry Kamin, (1948) Ph.D., *Associate Professor of Biochemistry*
John A. Kelingos, (1963) Ph.D., *Assistant Professor of Mathematics*
Van Leslie Kenyon, Jr., (1945) M.M.E., *Professor of Mechanical Engineering*
Alan C. Kerckhoff, (1958) Ph.D., *Associate Professor of Sociology*
§Gregory Adams Kimble, (1952) Ph.D., *Professor of Psychology*
Norman Kirshner, (1956) Ph.D., *Assistant Professor of Biochemistry and Nutrition*
¶¶¶Peter H. Klopfer, (1958) Ph.D., *Associate Professor of Zoology*
K. R. Knoerr, (1961) Ph.D., *Assistant Professor of Forestry*
Sigmund Koch, (1942-47; 1948) Ph.D., *Professor of Psychology*
Clarence Ferdinand Korstian, (1930) Ph.D., *Professor Emeritus of Silviculture*
Jack L. Kostyo (1959) Ph.D., *Assistant Professor of Physiology*
**Paul Jackson Kramer, (1931) Ph.D., *James B. Duke Professor of Botany*
Irwin Kremen, (1963) Ph.D., *Assistant Professor of Psychology*
William R. Krigbaum, (1952) Ph.D., *Professor of Chemistry*
Charles Albert Krummel, (1922) Ph.D., *Professor Emeritus of German*
††G. F. Kuder, (1948) Ph.D., *Professor of Psychology*
Wladyslaw W. Kulski, (1963) Dr. jur., *Visiting Professor of Russian Studies*
Sudhir Kumar, (1958) Ph.D., *Visiting Associate Professor in Civil Engineering*
Gary J. Kurowaski, (1962) Ph.D., *Visiting Associate Professor of Mathematics*
Weston La Barre, (1946) Ph.D., *Professor of Anthropology*
Creighton Lacy, (1953) B.D., Ph.D., *Associate Professor of Missions and Social Ethics*
Martin Lakin, (1958) Ph.D., *Assistant Professor of Psychology*
Charles Earl Landon, (1926) Ph.D., *Professor of Economics*
John Tate Lanning, (1927) Ph.D., *James B. Duke Professor of History*
William Thomas Laprade, (1909) Ph.D., *Professor Emeritus of History*
John E. Larsh, Jr., (1943) Sc.D., *Professor of Parasitology*
Richard H. Leach, (1955) Ph.D., *Associate Professor of Political Science*
Warren Lerner, (1961) Ph.D., *Assistant Professor of History*
†††John B. Lewis, (1961) Ph.D., *Associate Professor of Electrical Engineering*
Harold Walter Lewis, (1949) Ph.D., *Professor of Physics*
John L. Lievsay, (1962) Ph.D., *Professor of English*
***Daniel A. Livingstone, (1956) Ph.D., *Associate Professor of Zoology*
E. Croft Long, (1956) M.D., *Associate Professor of Physiology and Pharmacology*

** Absent on Sabbatical Leave, Spring Semester, 1964.
*** Absent on Sabbatical Leave, 1963-64.
†† Resigned, August 31, 1963.
††† Resigned, February 28, 1963.
§ Absent on Leave, 1963-64.
¶¶¶ Absent on Sabbatical Leave, 1964-65.

Walter E. Loomis, (1962) Ph.D., *Visiting Professor of Botany*
Richard Lowitt, (1963) Ph.D., *Visiting Associate Professor of History*
Robert M. Lumiansky, (1963) Ph.D., *Professor of English*
William S. Lynn, Jr., (1954) M.D., *Assistant Professor of Biochemistry*
K. S. McCarty, (1950) Ph.D., *Associate Professor of Biochemistry*
John S. McGee, (1962) Ph.D., *Professor of Economics*
***John C. McKinney, (1957) Ph.D., *Professor of Sociology*
Thomas J. McManus, (1961) M.D., *Assistant Professor of Physiology*
John Nelson Macduff, (1956) M.E.E., *Professor of Mechanical Engineering*
George L. Maddox, (1960) Ph.D., *Associate Professor of Sociology*
Alan Krebs Manchester, (1929) Ph.D., *Professor of History*
Joseph Eldredge Markee, (1943) Ph.D., *James B. Duke Professor of Anatomy*
Sidney David Markman, (1947) Ph.D., *Associate Professor of Art History and Archaeology*
Otto Meier, Jr., (1934) Ph.D., *Professor of Electrical Engineering*
Robert J. Menzies, (1962) Ph.D., *Professor of Zoology*
James L. Meriam (1963) Ph.D., *Professor of Engineering Mechanics*
Richard S. Metzger, (1962) Ph.D., *Assistant Professor of Immunology*
Johannes Horst Max Meyer, (1959) D.Sc., *Associate Professor of Physics*
John W. Moore, (1961) Ph.D., *Associate Professor of Physiology*
Montrose J. Moses, (1959) Ph.D., *Associate Professor of Anatomy*
§Francis Joseph Murray, (1960) Ph.D., *Professor of Mathematics*
Aubrey Willard Naylor, (1952) Ph.D., *Professor of Botany*
Glenn Robert Negley, (1946) Ph.D., *Professor of Philosophy*
Ernest William Nelson, (1926) Ph.D., *Professor of History*
Henry Winston Newson, (1948) Ph.D., *Professor of Physics*
Walter McKinley Nielsen, (1925) Ph.D., *James B. Duke Professor of Physics*
Holger O. V. Nygard, (1960) Ph.D., *Professor of English*
Walter D. Obrist, (1956) Ph.D., *Assistant Professor of Psychology*
David S. Onley, (1962) Ph.D., *Assistant Professor of Physics*
Henry John Oosting, (1932) Ph.D., *Professor of Botany*
††Robert Ornduff, (1962) Ph.D., *Assistant Professor of Botany*
J. G. Osborne, (1961) B.S., *Professor of Forestry*
Suydam Osterhout, (1959) Ph.D., *Assistant Professor of Microbiology*
Athos Ottolenghi, (1959) M.D., *Assistant Professor of Physiology and Pharmacology*
John R. Overman, (1955) M.D., *Associate Professor of Bacteriology*
Harry Ashton Owen, Jr., (1951) M.S.E., *Associate Professor of Electrical Engineering*
Harold Talbot Parker, (1939) Ph.D., *Professor of History*
Ransom Rathbone Patrick, (1954) M.F.A., Ph.D., *Professor of Aesthetics and Art*
Robert Lee Patterson, (1945) B.D., Ph.D., *Professor Emeritus of Philosophy*
William Bernard Peach, (1951) Ph.D., *Professor of Philosophy*
Talmage Lee Peele, (1939) M.D., *Professor of Anatomy*
Harold Sanford Perry, (1932) Ph.D., *Professor of Botany*
Anton Peterlin, (1962) Ph.D., *Adjunct Professor of Chemistry*
Ray C. Petry, (1937) Ph.D., LL.D., *Professor of Church History*
Olan Lee Petty, (1952) Ph.D., *Associate Professor of Education*
Leland R. Phelps, (1961) Ph.D., *Associate Professor of German*

*** Absent on Sabbatical Leave, 1963-64.
†† Resigned, August 31, 1963.
§ Absent on Leave, 1963-64.

Jane Philpott, (1951) Ph.D., *Associate Professor of Botany*
††Leo Pine, (1957) Ph.D., *Assistant Professor of Microbiology*
Jacques C. Poirier, (1955) Ph.D., *Associate Professor of Chemistry*
W. H. Poteat, (1960) B.D., Ph.D., *Associate Professor of Christianity and Culture*
Benjamin Edward Powell, (1946) Ph.D., *Librarian*
Richard Lionel Predmore, (1950) D.M.L., *Professor of Romance Languages*
Jack J. Preiss, (1959) Ph.D., *Associate Professor of Sociology*
Richard A. Preston, (1961) Ph.D., *Visiting Professor of History*
James Ligon Price, Jr., (1952) Ph.D., *Professor of Religion*
Charles H. Proctor, (1961) Ph.D., *Visiting Associate Professor of Sociology*
¶¶¶Jesse Harris Proctor, (1958) Ph.D., *Assistant Professor of Political Science*
***Louis DuBose Quin, (1956) Ph.D., *Associate Professor of Chemistry*
Charles William Ralston, (1953) Ph.D., *Associate Professor of Forest Soils*
Robert Stanley Rankin, (1927) Ph.D., *Professor of Political Science*
R. John Rath, (1963) Ph.D., *Visiting Professor of History*
Eugene M. Renkin, (1963) Ph.D., *Professor of Pharmacology*
Thomas D. Reynolds, (1953) Ph.D., *Associate Professor of Mathematics*
Henry Stoutte Roberts, Jr., (1948) Ph.D., *Associate Professor of Zoology*
John Henderson Roberts, (1931) Ph.D., *Professor of Mathematics*
Hermann R. Robl, (1959) Dr. habil., *Visiting Associate Professor of Physics*
Robert Samuel Rogers, (1937) Ph.D., F.A.A.R., *Professor of Latin*
Theodore Ropp, (1938) Ph.D., *Professor of History*
William L. Rowe (1963) Ph.D., *Associate Professor of Anthropology*
Donald Francis Roy, (1950) Ph.D., *Associate Professor of Sociology*
**Mabel F. Rudisill, (1948) Ph.D., *Associate Professor of Education*
Ralph Wayne Rundles, (1945) Ph.D., M.D., *Professor of Medicine and Microbiology*
Herman Salinger, (1955) Ph.D., *Professor of German*
John V. Salzano, (1956) Ph.D., *Assistant Professor of Physiology*
Charles Richard Sanders, (1937) Ph.D., *Professor of English*
Lloyd Saville, (1946) Ph.D., *Professor of Economics*
Dwight P. Saylor, (1961) Ph.D., *Visiting Assistant Professor of Physics*
John Henry Saylor, (1928) Ph.D., *Professor of Chemistry*
Mrs. Bodil Schmidt-Nielsen, (1956) D.D.S., Dr. Odont., Dr. Phil., *Associate Research Professor of Zoology*
Knut Schmidt-Nielsen, (1952) Mag.Sc., Dr. Phil., *James B. Duke Professor of Physiology*
Sally Hughes Schrader, (1962) Ph.D., *Visiting Professor of Zoology*
William E. Scott, (1958) Ph.D., *Assistant Professor of History*
Richard A. Scoville, (1961) M.A., *Assistant Professor of Mathematics*
Richard Seymour, (1958) Ph.D., *Associate Professor of German*
Charles W. Shoppee, (1962) Ph.D., *Visiting Professor of Chemistry*
R. Baird Shuman, (1962) Ph.D., *Associate Professor of Education*
Barry Shmavonian, (1958) Ph.D., *Associate Professor of Psychology*
Joseph R. Shoenfield, (1952) Ph.D., *Assistant Professor of Mathematics*
*****Ida H. Simpson, (1958) Ph.D., *Assistant Professor of Sociology*
***Allan P. Sindler, (1959) Ph.D., *Associate Professor of Political Science*

** Absent on Sabbatical Leave, Spring Semester, 1964.
*** Absent on Sabbatical Leave, 1963-64.
***** Absent on Sabbatical Leave, February 1, 1963 through August 31, 1964.
†† Resigned, August 31, 1963.
¶¶¶ Absent on Sabbatical Leave, 1964-65.

David A. Smith, (1962) M.A., *Assistant Professor of Mathematics*
David Tillerson Smith, (1930) M.D., Litt.D., *James B. Duke Professor of Bacteriology*
Donald S. Smith, II, (1961) M.H.A., *Assistant Professor of Hospital Administration*
Grover C. Smith, (1952) Ph.D., *Associate Professor of English*
†H. Shelton Smith, (1931) Ph.D., D.D., Litt.D., *James B. Duke Professor of American Religious Thought*
James M. Smith, (1962) Ph.D., *Visiting Professor of History*
Joel Smith, (1958) Ph.D., *Associate Professor of Sociology*
Peter Smith, (1959) Ph.D., *Assistant Professor of Chemistry*
Robert Sidney Smith, (1932) Ph.D., *Professor of Economics*
Marshall Spector, (1963) Ph.D., *Assistant Professor of Philosophy*
Hersey Everett Spence, (1918) B.D., D.D., Litt.D., *Professor Emeritus of Religious Education*
Joseph John Spengler, (1934) Ph.D., *James B. Duke Professor of Economics*
Robert Spira, (1962) Ph.D., *Visiting Assistant Professor of Mathematics*
Hertha D. E. Sponer, (1935) Ph.D., *Professor of Physics*
Olaf Stackelberg, (1963) Ph.D., *Assistant Professor of Mathematics*
W. J. Stambaugh, (1961) Ph.D., *Assistant Professor of Forestry*
Vivian T. Stannett, (1961) Ph.D., *Adjunct Professor of Chemistry*
Eric Stenius, (1961) D. Phil., *Visiting Professor of Philosophy*
Lionel Stevenson, (1955) B.Litt. (Oxon.) Ph.D., F.R.S.L., *James B. Duke Professor of English*
William Franklin Stinespring, (1936) Ph.D., *Professor of Old Testament and Semitics*
Donald E. Stone, (1963) Ph.D., *Assistant Professor of Botany*
Hiram M. Stout, (1962) Ph.D., *Visiting Professor of Political Science*
Howard Austin Strobel, (1948) Ph.D., *Associate Professor of Chemistry*
John Strugnell, (1960) M.A., *Visiting Assistant Professor in Religion*
Wippert A. Stumpf, (1948) Ph.D., *Professor of Education*
Henry L. Sublett, Jr., (1962) Ed.D., *Assistant Professor of Education*
John Dennis Sullivan, (1959) Ph.D., *Assistant Professor of Wood Technology*
Elizabeth Read Sunderland, (1939-42; 1943) Ph.D., *Associate Professor of Art*
Lewis E. Swanson, (1949) A.B., *Associate Professor of Hospital Administration*
Charles Tanford, (1959) Ph.D., *Professor of Biochemistry*
Frank Tangherlini, (1961) Ph.D., *Visiting Assistant Professor of Physics*
Ralph E. Thiers, (1960) Ph.D., *Associate Professor of Biochemistry*
Joseph Miller Thomas, (1930) Ph.D., *Professor of Mathematics*
Edgar Tristram Thompson, (1935) Ph.D., *Professor of Sociology*
E. Clifford Toren, Jr., (1961) Ph.D., *Assistant Professor of Chemistry*
D. C. Tosteson, (1961) M.D., *Professor of Physiology*
James Nardin Truesdale, (1930) Ph.D., *Professor of Greek*
††Herman Turk, (1959) Ph.D., *Assistant Professor of Sociology*
Arlin Turner, (1953) Ph.D., *Professor of English*
Charles Rowe Vail, (1939) Ph.D., *Professor of Electrical Engineering*
F. John Vernberg, (1951) Ph.D., *Associate Professor of Zoology*
Patrick R. Vincent, (1954) Ph.D., *Associate Professor of Romance Languages*
Clement Vollmer, (1926) Ph.D., *Professor Emeritus of German*
Herbert von Beckerath, (1935) Ph.D., *Professor Emeritus of Economics and Political Science*
Warren Chase Vosburgh, (1928) Ph.D., *Professor Emeritus of Chemistry*

† Retired, August 31, 1962.
†† Resigned, August 31, 1963.

Salih J. Wakil, (1959) Ph.D., *Associate Professor of Biochemistry and Nutrition*
Herman Walker, (1962) Ph.D., *Visiting Professor of Political Science*
Michael Wallach, (1962) Ph.D., *Associate Professor of Psychology*
Richard L. Walter, (1962) Ph.D., *Assistant Professor of Physics*
†Loring Baker Walton, (1929) Lic. és L. Ph.D., *Professor of Romance Languages*
Calvin L. Ward, (1952) Ph.D., *Associate Professor of Zoology*
Charles Eugene Ward, (1927) Ph.D., *Professor of English*
Bruce W. Wardropper, (1962) Ph.D., *Professor of Romance Languages*
Seth L. Warner, (1955) Ph.D., *Associate Professor of Mathematics*
Richard Lyness Watson, Jr., (1939) Ph.D., *Professor of History*
***Henry Weitz, (1950) Ed.D., *Associate Professor of Education*
Richard L. Wells, (1962) Ph.D., *Assistant Professor of Chemistry*
Paul Welsh, (1948) Ph.D., *Professor of Philosophy*
Robert W. Wheat, (1956) Ph.D., *Assistant Professor of Biochemistry*
Richard A. White, (1963) Ph.D., *Assistant Professor of Botany*
Alban Gregory Widgery, (1930) M.A., *Professor Emeritus of Philosophy*
Karl Milton Wilbur, (1946) Ph.D., *James B. Duke Professor of Zoology*
***Robert L. Wilbur, (1957) Ph.D., *Associate Professor of Botany*
Pelham Wilder, Jr., (1949) Ph.D., *Professor of Chemistry*
Mrs. Hilda Pope Willett, (1948) Ph.D., *Associate Professor of Bacteriology*
***George W. Williams, (1957) Ph.D., *Associate Professor of English*
James W. Williams, (1937) M.S., *Professor of Civil Engineering*
Robert Marshall Williamson, (1951) Ph.D., *Associate Professor of Physics*
A. Leslie Wilson, (1961) Ph.D., *Associate Professor of German*
Neil L. Wilson, (1957) Ph.D., *Assistant Professor of Philosophy*
Robert Renbert Wilson, (1925) Ph.D., LL.D., *James B. Duke Professor of Political Science*
Thomas George Wilson, (1959) D.Sc., *Professor of Electrical Engineering*
Manfred Winnewisser, (1963) Ph.D., *Instructor in Physics*
H. H. Winsborough, (1962) Ph.D., *Assistant Professor of Sociology*
Orval S. Wintermute, (1958) B.D., *Assistant Professor in Religion*
Frederick Adolphus Wolf, (1927) Ph.D., *James B. Duke Professor Emeritus of Botany*
Donald J. Wood, (1962) Ph.D., *Assistant Professor of Civil Engineering*
Frank Wilson Woods, (1958) Ph.D., *Assistant Professor of Silviculture*
Robert Hilliard Woody, (1929) Ph.D., *Professor of History*
§§J. B. Wyngaarden, (1959) M.D., *Associate Professor of Biochemistry*
William P. Yohe, (1958) Ph.D., *Associate Professor of Economics*
James G. Yoho, (1957) Ph.D., *Professor of Forest Economics*
Charles R. Young, (1954) Ph.D., *Associate Professor of History*
Karl Edward Zener, (1928) Ph.D., *Professor of Psychology*
Chester M. Zmijewski, (1963) Ph.D., *Assistant Professor of Immunology*

*** Absent on Sabbatical Leave, 1963-64.
† Retired, August 31, 1963.
§§ Absent on Leave, August 1963 through July 1964.

# General Regulations Governing Graduate Study

## *Admission*

PREREQUISITES. A student seeking admission to the Graduate School of Arts and Sciences of Duke University must have received an A.B. or B.S. degree (or the equivalent in the case of foreign students) from an accredited institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study. Normally he should have majored in the area of his intended graduate study. Many departments (see Courses of Instruction, pp. 59 ff.) list specific prerequisites. Students are urged to anticipate at least one of the language requirements (see pp. 25-27).

STUDENTS REQUIRING ADMISSION. Admission is required of 1) all students who intend to pursue study toward a degree offered by the Graduate School, 2) all other students who desire credit for whatever purpose for graduate courses—except students who register as Special Students in the Summer Session. Students who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean to undertake a doctoral program.

PROCEDURE FOR ALL APPLICANTS. A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should fill out completely and return promptly. In addition he should provide the following supporting documents: (1) a transcript or transcripts of all his undergraduate and graduate work mailed directly by the registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; (4) scores on the Graduate Record Examination or Miller Analogies Test as indicated.

GRADUATE RECORD EXAMINATION AND MILLER ANALOGIES TEST. Scores on the Graduate Record Examination and the Miller Analogies Test are always welcomed and must be submitted if either has been taken or if the applicant requests a fellowship.

They may be requested of any applicant whose record is marginal. Departmental requirements are listed below (**required, *strongly recommended):

| | Graduate Record Examination | | |
|---|---|---|---|
| | Aptitude Test | Advanced Test | Miller Analogies Test |
| Anatomy | ** | | |
| Biochemistry | * | * | |
| Botany | * | * | |
| Chemistry | * | * | * |
| Civil Engineering | * | * | |
| Economics | ** | ** | * |
| Electrical Engineering | * | * | |
| English | ** | ** | * |
| Forestry | * | | |
| German | * | * | |
| History | * | * | |
| Mathematics | * | * | |
| Mechanical Engineering | * | * | |
| Philosophy | ** | * | **[1] |
| Physics | * | * | |
| Physiology | * | | |
| Political Science | * | * | |
| Psychology | ** | | ** |
| Religion | * | | * |
| Romance Languages | ** | ** | |
| Sociology | * | * | |
| Zoology | ** | ** | **[1] |

[1] Either GRE or MAT acceptable

(Information on times and places of Graduate Record Examinations can be provided at the applicant's college or by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.)

ADDITIONAL PROCEDURE FOR FOREIGN STUDENTS. Fully qualified students from outside the United States are welcomed in the Graduate School to take courses and in many instances to study toward a degree. In applying for admission the foreign student should, in addition to the information required of all students, submit with his application (1) if his native language is not English, a statement by a qualified official that the applicant can read, write, speak, and understand English well enough to pursue a program of graduate study, (2) a statement certified by a responsible person that his finances are sufficient to maintain him during his stay at Duke University, and (3) a statement by a qualified medical doctor describing

any emotional or physical illness the applicant has had during the previous five years.

All foreign students whose native language is not English will be examined during their first registration period for competence in the use of oral and written English. Until competence is determined, admission and arrangements for an award involving teaching must remain provisional. Students found to lack the necessary competence will be required to enroll in the non-credit course English for Foreign Students and to reduce their course or research program three units if necessary. Passing this examination or the course, if it is required, will not meet degree requirements for a foreign language. See page 27.

CLOSING DATES FOR APPLICATIONS. Because applications cannot be reviewed until all required supporting documents are filed, applications should be submitted at least **two weeks** before the closing dates listed below:

| | |
|---|---|
| Fall semester admission and award | February 15 |
| Fall semester, admission only | August 1 |
| Spring semester, admission only | January 1 |
| Summer Session,* First Term | May 9 |
| Summer Session,* Second Term | June 16 |

It is the applicant's responsibility to make certain that his application is completed and in order before the dates specified.

NOTIFICATION AND STATUS. When the application is approved, the student will receive a letter of admission and an acceptance form. The process of admission is not complete until the statement of acceptance has been returned.

Applicants who are admitted will be offered full admission, provisional admission, or non-degree admission. *Provisional admission* is offered to students who (1) appear to warrant admission but who do not fully comply with admission requirements, for a trial period of one semester or a minimum of 12 hours of course work, or (2) are admissible except that the application lacks a letter of recommendation, a supplementary transcript, required test scores, or some other required information. *Non-degree admission* is offered to students who (1) have no intention of taking an advanced degree at Duke University but wish to take courses for accreditation, for transfer to other institutions, or for other purposes, (2) do not fully meet admission requirements but wish to further their academic interests, and (3) who apply late and must register before the application can be fully considered. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and

* Students seeking admission to the Graduate School for study in the Summer Session should make application to the Dean of the Graduate School as well as to the Director of the Summer Session.

when upon review the student is granted full admission; graduate credit earned under *non-degree* status may not be applied toward an advanced degree at Duke University. Late applicants ((3) above) will be granted full admission if admission can be completed within two weeks of registration.

## *Registration*

WHO MUST REGISTER. (1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in *in absentia* status; (4) all students who wish merely to audit a course or courses.

REGISTRATION. After the applicant has received notification of his admission to the Graduate School and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the *Bulletin,* he first confers with the Director of Graduate Studies of his major department, who prepares and signs a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. *Former students* who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

LATE REGISTRATION. All students are expected to register or pre-register at the times stated in the *Bulletin.* Those registering late are subject to a *late registration fee of five dollars.*

CHANGE OF REGISTRATION. During the academic year within a period of *fourteen days* from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean.

## *Grades, Hours, and Credits*

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in

terms of course hours and credits. The term *residence* designates full-time study and research in close proximity to facilities provided for both as opposed to part-time study incidental to a full-time occupation. Here required *residence* of one year is defined as two successive academic semesters of not less than nine units registration each semester. Credit for courses and seminars, research, and residence, and corresponding tuition and fees are stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour.

## CREDITS EARNED OUTSIDE THIS GRADUATE SCHOOL

(1) *Graduate Credit Earned before the A.B. Degree Is Granted.* Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his A.B. or B.S. degree. However, an undergraduate student at Duke University who, at the beginning of his final semester, lacks no more than 9 semester hours of fulfilling the requirements for the A.B. or B.S. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to fifteen hours a week. Such graduate courses will be credited toward the A.M., M.S., M.Ed., or M.A.T. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of the final semester.

(2) *Transfer of Graduate Credits.* Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the student through his Director of Graduate Studies should file a request that his credits be reviewed and a decision made.

(3) *Graduate Credit for Courses Taken in the School of Law.* Upon the recommendation of the Director of Graduate Studies, and upon the approval of the Dean of the Graduate School, students in the social sciences may take certain courses in the School of Law for graduate credit. In some instances courses in the School of Law may be considered as fulfilling a student's requirements for a minor. To register for such courses, the student should present a letter from his Director of Graduate Studies to the Dean of the School of Law requesting permission to register for certain specified courses.

(4) *Reciprocal Agreement with the Consolidated University of North Carolina.* Under a plan of co-operation between the Consolidated University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the Consolidated University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees

regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the Consolidated University of North Carolina. Beginning in 1962 as an experiment, a similar arrangement is effective in the Summer Session. See the Summer Session Bulletin for terms of this arrangement.

GRADES. Grades in the Graduate School are as follows: *E, G, S, F,* and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, *for an acceptable reason,* at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of *F* is entered upon the student's record unless his appeal to the Dean for the grade *No Credit* is approved. The grade of *Z* indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of *F* in a major course normally occasions withdrawal from a degree program; a grade of *F* in a minor course occasions academic probation.

COURSES PRIMARILY FOR UNDERGRADUATES. Students granted provisional admission and others whose preparation is found deficient may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses *outside the major department* may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Directors of Graduate Studies in the major department and in the department in which the course is listed and by the supervisor of the program.

NORMAL REGISTRATION. A graduate student is designated as fully registered when he registers for the maximum credit his program requires. Required registration is set in consideration of the student's obligation to teach or assist and the stage he has reached in completion of degree requirements. Normal registration for the resident student who does not hold an appointment as part-time instructor or assistant is 15 units a semester or 30 units an academic year. The normal registration for the student who holds such an appointment is either 12 units or a minimum of 9 depending upon the number of hours a week he is required to teach or assist.

The resident student in a terminal master's program which requires no thesis carries normal registration until he has met all degree requirements. If a thesis is required and the student has met all requirements except for submitting his thesis, he registers for 3 units a semester while in residence or, if he elects to go out of residence, for 1 unit *in absentia* (a semester) until the thesis is accepted.

The resident student engaged in a master's program which is not terminal but preparatory to a doctoral program registers as though he were a doctoral student.

The resident student in a doctoral program carries normal registration through the semester in which he passes the preliminary examination. Thereafter until the dissertation is accepted he registers for a minimum of 3 units a semester. If he elects at any time to go out of residence, to keep his program active he registers for 1 unit a semester *in absentia.*

The registration of 1 unit a semester *in absentia* is not considered full registration and does not provide access to library carrel, laboratory space, or Student Health but does permit occasional consultation with the thesis or dissertation supervisor. It may be waived for military duty or serious problems of health. Master's candidates subject to the fee for submitting a thesis in the academic year may credit the 1-unit fee to this charge.

In the Summer Session 6 units a term is maximum registration. Students resident in the academic year who wish to continue study and use of University facilities including Summer Session Student Health during the summer must register for 1 unit in the first Summer Session term. This registration provides use of these facilities for both terms.

## WITHDRAWAL AND INTERRUPTION OF PROGRAM

*From a Course.* For permissible changes during the first thirty days after the registration date, see Change of Registration, page 21. If a course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F.* If a course is dropped after the thirty-day period, the status of the student at the time of withdrawal from the course will be determined and be indicated on the permanent record as *Withdrew Passing (W.P.) or Withdrew Failing (W.F.).*

*From the Graduate School.* The University reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the Graduate School, he should notify both the Director of Graduate Studies in his major department and the Dean of the Grad-

uate School prior to the date of his expected withdrawal. (For refunds upon withdrawal, see below, p. 21.)

A student who fails a course or seminar in his major subject will normally be asked to withdraw not later than the end of the ensuing semester or term. Failure in a minor subject places the student on academic probation.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, leave with the Graduate Office a statement of the reason for interruption, mailing address, and expected date of return. If they are subject to registration *in absentia,* they should arrange for such registration before departure.

A foreign student who after successfully completing a minimum of one semester's graduate study must withdraw for the purpose of returning home before the completion of a graduate program may with the approval of his major department request the Dean to issue him a Certificate of Graduate Study.

TRANSCRIPT. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Central Records Office.

SIZE OF CLASSES. Classes which carry graduate credit are limited in size to thirty students. In exceptional cases this regulation may be modified, but only by permission of the Executive Committee of the Graduate School Faculty on the recommendation of the department concerned. When courses numbered 200 to 299 carry graduate credit, they may include no more than three juniors and such juniors must, at the time of registration, have an over-all B average.

## *Language Requirements*

Because a requirement for the A.M. degree is mastery of one acceptable foreign language, and for the Ph.D. is mastery of two, the prospective graduate student should attain mastery of at least one acceptable foreign language and preferably two before applying for admission. The facilities for graduate study are highly specialized and costly. The student who must lay them aside to acquire what he could have learned as an undergraduate is wasting his time.

To prevent delay in meeting this requirement, students whose programs call for mastery of French, Spanish, or German and who have studied the language must take the objective examination at their first registration period.

ACCEPTABLE LANGUAGES. The languages normally required are French, German, and Russian, but with the approval of the Dean of the Graduate School, a student may substitute for any one of these another language which has a definite relation to the candidate's program of work for the degree and for which an examination can be provided.

MEETING THE REQUIREMENT. Language requirements may be met in three ways—by transcript, by an objective examination taken upon first registration, by a reading examination.

1. BY TRANSCRIPT. Under the conditions stated below, a *candidate for the Ph.D.* may, with the permission of the Dean of the Graduate School and of the chairman of the program committee, meet one of his language requirements by filing a transcript or certification showing that he has passed a comparable examination elsewhere. The conditions are that the examining graduate school has substantially the same language requirements as this Graduate School, that the examination has been passed while the student was pursuing a Ph.D. program in the same field as his declared major at Duke University or that the examination was required of all Ph.D. candidates regardless of field, and that the examination has been passed recently enough to indicate that the student retains command of the language.
2. BY OBJECTIVE EXAMINATION. On Monday of the fall registration period and on the day before spring registration, Reading, Vocabulary, and Grammar tests in French, German, and Spanish are offered (see the Calendar for hour and place). Any entering student engaging upon an A.M. or Ph.D. program who has not already taken these tests may take them. (He should seek prior assurance that Spanish is acceptable.) On the basis of his scores the student will (1) be certified as meeting requirements in these languages, (2) be advised to present himself for the regular reading examinations at the first opportunity, or (3) be advised to enroll in the special reading courses (see below).
3. BY READING EXAMINATION. At dates listed in the Calendar reading examinations in French, German, Spanish, and, when requested, Italian are offered. Reading examinations in other languages must be individually arranged.

   Students who require re-examination at scheduled times will be charged $5.00 for each re-examination; if special times are necessary, the fee will be $10.00. Examinations at special times cannot be offered in French and Spanish.

SPECIAL READING COURSES. Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall

semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time. Undergraduates may not enroll during the academic year and may, with permission of the Dean of the Graduate School, in the Summer Session only if total registration permits.

REQUIREMENTS FOR FOREIGN STUDENTS. Foreign students whose native language is not English are, during their first registration period, required to take a test for minimum competence in English (see p. 20). Such students, with the approval of the Director of Graduate Studies in their major department, may request permission of the Dean of the Graduate School to substitute English for *one* of the required foreign languages. If permission is granted, an additional reading test in English, like those in French and German, will be arranged.

# Degrees Offered

THE DEGREES OFFERED. The Graduate School of Arts and Sciences now offers the following degrees: Master of Arts (A.M.), Master of Science (M.S.), Master of Education (M.Ed.), Master of Arts in Teaching (M.A.T.), Master of Hospital Administration (M.H.A.), Doctor of Philosophy (Ph.D.), and the Doctor of Education (Ed.D.).

## *General Regulations Governing Master's Degrees*

RESIDENCE REQUIREMENTS. Candidates for all Master's degrees must spend, as a *minimum,* one full academic year, or its equivalent in Summer Session terms, in residence at Duke University. (See p. 23.) Those who wish to complete their degrees wholly in the Summer Session must be in residence for five terms. Often more time will prove necessary in either case, depending upon the nature of the student's research problem if a thesis is offered and upon the student himself.

A Master's degree *without thesis* requires a *minimum* of 30 units of graduate credit in course and seminar work properly distributed between major and minor fields.

A Master's degree *with thesis* requires a *minimum* of 30 units of graduate credit; not less than 24 units must be in course or seminar work properly distributed between major and minor fields. If after completion of the 30-unit requirement the candidate remains in residence, he must register for a minimum of 3 units per semester.

A Master's candidate who presents a thesis when not registered in residence will be charged 3 units of residence for the semester in which the thesis is presented. (See above p. 23 and for fees for completing the degree during the Summer Session see the Summer Session Bulletin.)

CANDIDACY FOR THE MASTER'S DEGREE. To be considered as a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T., M.H.A.), the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during his first period of residence, he must make passing grades on the first 12 units of graduate courses), (2) have made a grade of *G* or *E* on at least 3

units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T., of the supervisory committee).

TRANSFER OF GRADUATE CREDITS. (See above, p. 22.)

Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum of required registration at Duke University.

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 units of further undergraduate training or 6 units of required language courses on the undergraduate level. In no case will credit be allowed for extension or correspondence courses.

TIME LIMITS FOR COMPLETION OF MASTER'S DEGREES. The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree *within two calendar years* from the date of his first registration in the Graduate School. *Any candidate* must complete all requirements *within six calendar years* of his first registration.

THE THESIS. The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on his special research problem. Although a publishable document is not required, the thesis must be written in an acceptable style and should exhibit the student's competence in scholarly procedures. Requirements of form are set forth in the the Duke University *Manual of Style for Theses and Dissertations,* revised 1961, obtainable at the Duke University Book Store.

## *The Master of Arts*

PREREQUISITES. As prerequisites to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments require more than 12 semester hours, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in this Bulletin.

LANGUAGE REQUIREMENTS. The candidate for the A.M. degree must have a reading knowledge of at least one foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) For methods of satisfying language

requirements see p. 25. The language requirements must be satisfied before the Master's examination is taken.

MAJOR AND MINOR SUBJECT. In his graduate work the student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major subject. The student must take a minimum of 6 units in a minor subject or related fields which are approved by his major department. The remaining 6 units of the required 24 may be taken in either the major or minor department, or in another approved by the major department and by the Dean of the Graduate School. In addition he must present a thesis, which carries a credit of 6 units for which he must register. Thus, his earned credit for the degree totals a *minimum* of 30 units.

FILING THE THESIS TITLE. At least one month before presenting the thesis, that is on or *before March 1 for a June degree* or on or *before July 1 for a September degree,* the student must file with the Dean of the Graduate School, on the official form, the title of the thesis and declaration of intention to graduate. The title must have the approval of the Director of Graduate Studies in the major department, and of the thesis supervisor.

PREPARING THE THESIS. All basic requirements for preparing the thesis are described in the *Manual of Style for Theses and Dissertations,* revised 1961, obtained at the Duke University Book Store, West Campus. The quality of paper, form, and binding are prescribed in the *Manual.*

SUBMITTING THE THESIS. Four typewritten copies of the thesis bound in snap binders supplied by the Library must be submitted in approved form to the Dean of the Graduate School on or before May 1 for a June degree or August 1 for a September degree and three to five days before the scheduled date of the student's examination. The copies will then be distributed to the several members of the examining committee. Two copies for the Library will be bound by the Ruzicka Bindery, fee $5.00 a volume. The student will state whether or not he wishes more than two so bound.

THE EXAMINING COMMITTEE AND THE EXAMINATION. The instructor who directs the thesis appoints an examining committee composed of the supervisor of the thesis and two other members of the Graduate Faculty, one of whom must be from a department other than that of the major. If the student has been permitted to take related work within the major department, the third member may represent the minor field within the department. This committee is submitted for approval to the Dean of the Graduate School when the thesis is first presented.

The candidate appears before this committee for an examination which lasts for about one and one-half hours. The subject matter

covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies this fact by signing the title page of all copies of the thesis. The candidate then returns the original, the first carbon copy of the thesis, and any others he wishes bound by Ruzicka, to the Dean of the Graduate School, who deposits them in the University Library.

## *The Master of Science*

PREREQUISITES. The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours work in the major field.

FOREIGN LANGUAGE. There is no foreign language requirement for this degree.

MAJOR AND MINOR SUBJECTS. The work for the Master of Science degree is designed to provide a broad foundation in the fields of civil, electrical, and mechanical engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses: at least 12 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 6 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 6 of the 24-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of Engineering. In addition to the 24-unit course requirement, the student must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

REGULATIONS AND PROCEDURES. The regulations and procedures for the thesis and the provisions for examination and an examining committee are the same as those for the Master of Arts degree.

## *The Master of Education*

PREREQUISITES. Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

Before the degree is conferred the student must have had one year

of actual teaching experience, or have met certification requirements by supervised student teaching in an accredited school. Such supervised student teaching may be at either the undergraduate or the graduate level.

REQUIREMENTS FOR THE DEGREE. The Master of Education degree may be earned either with or without the presentation of a thesis.

*Without thesis:* The required work includes a departmental major (Administration, Counseling, Elementary Education, or Secondary Education) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. This examination shall be prepared and conducted by the instructors of the student's major as designated by the Director of Graduate Studies of the Department of Education. Request to take this examination should be made to the Director of Graduate Studies at least two weeks before the date on which the examination is to be conducted.

*With thesis:* Students who elect this plan are permitted to substitute a thesis for 6 units for the required course work. The thesis subject must be approved by the instructor who is to direct it, and by the Director of Graduate Studies.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside of the Department of Education. The remaining 6 units are elective within the area of Education and the minor field, but require the approval of the student's major advisor and the Director of Graduate Studies.

The regulations governing the thesis are the same as those for the Master of Arts degree.

## *The Master of Arts in Teaching*

PREREQUISITES. The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. Should a student wish to undertake a graduate major different from his undergraduate major,

the prerequisites may be modified upon the recommendation of the student's committee and the approval of the Dean of the Graduate School.

PROGRAMS FOR THE DEGREE. Either of two programs may be arranged, in consultation with the student's committee:

A. A major in Education of 18 to 24 units and 6 to 12 units in non-education courses (for students seeking certification).

B. A major in non-education courses of 18 to 24 units and 6 to 12 units in Education (for students already certified).

In both programs a *minimum* of 30 units is required.

The non-education courses are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student. A major in Biological Sciences or in Physical Sciences is possible in this program.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations governing the thesis are the same as those for the A.M. (see p. 30). Candidates for the Master of Arts in Teaching who have not had teaching experience are required to take Education 215-216 in which case a minimum of 36 units is required.

THE COMMITTEE. Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in the major department or area. This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another department. The chairman of the committee will normally be chosen from the department of the major.

RECOMMENDATION FOR TEACHER CERTIFICATION. Elementary School teachers who already hold certificates and who desire the recommendation of Duke University for a graduate teaching certificate must include in their Master's program a minimum of 12 semester hours in subjects ordinarily taught in elementary school and 12 semester hours in courses in education designed to improve them as elementary school teachers.

Secondary school teachers who already hold certificates and desire the recommendation of Duke University for graduate teaching certificates must include in their Master's program a minimum of 18 semester hours in their teaching fields and 6 semester hours in courses in education designed to improve them as secondary school teachers.

## *The Master of Hospital Administration*

PREREQUISITES. The Master of Hospital Administration degree is designed for persons intending to pursue a career of management in hospitals and other health agencies.

No specific undergraduate major is required for participation in graduate studies leading to this degree, but certain courses are prerequisites. Required are:

2 semesters of natural sciences
2 semesters of economics or political science, or 1 semester of each
2 semesters of psychology or sociology, or 1 semester of each
2 semesters of accounting, either basic or managerial

In selected cases, students who have not completed all prerequisites may be admitted on a conditional basis subject to completion of deficiencies while completing other requirements of the degree program.

PROGRAM FOR THE DEGREE. The program for this degree includes 36 graduate units, of which 18 are in courses in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology.

Completion of this program ordinarily requires 24 months. Included is a 12-month administrative residency which is conducted under faculty supervision in hospitals and other health agencies within commuting distance of the University campus. A portion of the residency is devoted to preparation and presentation of a written management study.

COMPREHENSIVE EXAMINATION. Successful completion of a comprehensive examination, consisting of both oral and written phases, is a prerequisite qualification for the M.H.A. degree.

## *The Doctor of Philosophy*

The Ph.D. degree is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

REQUIREMENTS FOR THE PH.D. DEGREE. The formal requirements, discussed in detail below, for the Ph.D. degree are as follows: (1) foreign languages; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence; (5) preliminary examination; (6) dissertation; (7) final examination. In

order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of *G* or better.

FOREIGN LANGUAGES. Normally, a reading knowledge of both French and German is required. (For methods of meeting this requirement, see p. 25.)

A student working toward the doctoral degree should complete the languague requirements for that degree by the end of his first year of residence. If he fails to meet these requirements by the end of his third semester of residence, he must register in the appropriate special reading course or courses (see page 26) until he has satisfied the requirements.

MAJOR OR MINOR. The student's program of study necessarily demands substantial concentration on courses in his major department. It must, however, include a minimum of six units in a minor subject or related fields approved by his major department. Use of related fields within the major department requires the approval of the Dean of the Graduate School.

COMMITTEE TO SUPERVISE THE PROGRAM OF STUDY. As early in a student's course of study as is practicable and *not later than two months before the preliminary examination* the Director of Graduate Studies in the major department will nominate for the approval of the Dean a supervising committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor if a minor is involved. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. However, should all members of the committee be from the major department, at least one member of another department will be added or substituted for the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

RESIDENCE. For students who first registered in September 1959 or thereafter the *minimum* registration requirement is 60 units of graduate credit not more than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the A.B. or B.S. degree must plan to spend in residence a *minimum* of two academic years; if he enters with the A.M., his *minimum* residence is one academic year.

(For the definition of *residence,* see page 21.) If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements if any above the minimum the student must meet.

For requirement of registration see Normal Registration above, page 21.

TIME LIMITATIONS. 1) At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2) The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3) The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

CREDIT FOR SUMMER WORK. Credit earned in the Summer Session will not reduce the minimum required residence (see above, page 21).

PRELIMINARY EXAMINATION. A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take the examination in this Graduate School. The examination ordinarily covers both the major and minor fields.

Except in unusual circumstances approved by the Dean, a preliminary examination will not be scheduled between the last day of the spring semester examination period and registration day in the fall semester.

PRIVILEGE OF RE-EXAMINATION. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

THE DISSERTATION. The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

FILING TITLE. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

FORM. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the *Manual of Style for Theses and Dissertations,* revised 1961, to be obtained from the Duke University Book Store, West Campus.

SUBMITTING DISSERTATION. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before *April 15* preceding the June commencement when the degree is to be conferred. The dissertation must be submitted to the Graduate Office from seven to ten days before the scheduled date of the student's examination.

PUBLICATION ON MICROFILM. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in *Dissertation Abstracts. Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure* together with a microfilming agreement which is signed and returned when the dissertation is finally deposited in the Graduate Office.

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an *abstract,* carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A nonreturnable dissertation fee of $25 is charged for handling and microfilming. If copyright is desired, an additional fee is charged of $6

plus 2½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is $5.00 a volume. The student may request that more than the two copies be so bound.

FINAL EXAMINATION. The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

## *The Doctor of Education*

The Doctor of Education degree is a professional degree planned for those who are, or intend to become, school administrators, supervisors, directors of instruction, curriculum consultants, or college teachers of education.

ADMISSION. The candidate for the Ed.D. degree must meet the same requirements for admission to the Graduate School as the candidate for the Ph.D. degree. In addition to these uniform requirements, the candidate for the Ed.D. (1) must have had at least two years' experience in educational work; (2) must present strong letters of appraisal and recommendation from persons well qualified to speak with authority of his abilities; and (3) must present himself, if possible, for a personal interview. The Standing Committee on the Ed.D. degree reserves the right to insist upon an interview.

*Persons who are primarily concerned with meeting requirements set by North Carolina for the advanced certificate for principals and supervision must request and secure admission for doctoral study.*

RESIDENCE, ETC. Regulations concerning residence requirements, grades required during the first year of graduate study, and the preliminary examination are the same as those for the Ph.D. (See pp. 34-37.)

FOREIGN LANGUAGES. There are no foreign language requirements for the Ed.D. degree.

PROGRAM OF WORK. The candidate for the Ed.D. degree will choose as his major field either Educational Administration and Supervision or Curriculum and Instruction.

Candidates in Administration and Supervision will take approximately 24 units in that field, including the seminar in School Administration. In addition, they will take approximately 18 units in other professional courses, and a minor of approximately 18 units approved by the candidate's supervisory committee and the Standing Committee on the Ed.D. degree.

Candidates in Curriculum and Instruction will take approximately 24 units in Curriculum and Instruction. In addition, they will take approximately 12 units in other professional courses, and a minor of approximately 24 units in the humanities, the natural sciences, or the social sciences, exclusive of professional education.

The program of work for each candidate must be approved by the Standing Committee for the Ed.D. degree.

DISSERTATION. The candidate must write a dissertation, for which the formalities of presentation, including its defense in a final examination, are the same as those for the Ph.D. degree. The type of dissertation will depend upon which of the following plans the candidate adopts:

Plan A. A candidate choosing Plan A will write a dissertation which is expected to be a mature and competent piece of writing, embodying the results of significant and original research. It must be, in essence, a contribution to knowledge.

Plan B. A candidate choosing Plan B will serve at least a year in an administrative post, or a teaching position in an elementary or secondary school, subsequent to the completion of all course requirements and a year of residence. His dissertation may be concerned with a problem, or several closely related problems, growing out of this experience. Although the dissertation written under Plan B is of a practical nature, it must demonstrate the candidate's ability to investigate and report on a significant phase of education in his major field.

PUBLICATION ON MICROFILM. The dissertation will be published on microfilm, as is the dissertation for the Ph.D. (See p. 37.)

FINAL EXAMINATION. Regulations for the final examination are identical with those for the Ph.D. degree. (See p. 38.)

# Awards and Fees

## *Fellowships, Scholarships, and Assistantships*

FOR the encouragement and financial assistance of graduate students of marked ability, Duke University has established a considerable number of fellowships, scholarships, and assistantships. The stipends for these range from $600 to $3,400. Holders of grants pay tuition and other fees regularly required of all graduate students.

Fellows and scholars pay full tuition and fees and are expected to register for a full schedule of course work each semester. In general, assistants register for a four-fifths program and pay 12 units tuition and fees per semester.

APPLICATION FOR AWARDS. Applications for these awards, along with all supporting documents, must be submitted on or before February 15. Notification of awards is made about April 1. Late applications will be considered, should any vacancies occur in the list of appointees. No appointment is made for longer than one academic year.

Further information and application forms may be obtained from the Dean of the Graduate School, Duke University.

Awards offered for 1964-65 are:

FELLOWSHIPS: Approximately thirty James B. Duke Fellowships with stipends of $3,400; one Angier Duke Memorial Fellowship of $3,400, one Ottis Green Foundation Fellowship in Humanities or Social Sciences of $2,500; four Gurney Harriss Kearns Fellowships in Religion ranging up to $2,800; University Fellowships ranging from $2,000 to $3,000.

UNIVERSITY SCHOLARSHIPS. The University offers a number of scholarships with stipends ranging from $600 to $1,800.

GRADUATE ASSISTANTSHIPS. Appointments as Departmental Assistants and readers carry a total stipend in the range of $1,000 to $3,100. The value of stipend is determined by the fraction of time given to assisting, the qualifications of the assistant, and the nature of work assigned.

RESEARCH ASSISTANTSHIPS. Appointment for predoctoral candidates whose special training and qualifications enable them to serve as assistants to individual staff members in certain departments. Stipends range from $600 to $3,000 based on the assisting time required.

Appointments to qualified, advanced students as Research Asso-

ciates, Research Fellows, and Research Scholars. Stipends range upward from about $1,800.

COKESBURY GRADUATE AWARDS IN COLLEGE TEACHING. These awards, sponsored by the Board of Education of the Methodist Church, are designed to assist graduate students who are committed to a Christian philosophy of higher education and who intend to teach in college. The applicant must have been a member of the Methodist Church for at least three years, and must have been accepted for or be currently pursuing a program of graduate studies at one of the Methodist-related universities, including Duke University, approved for this program. Awards, for one year, vary in amount from $600 to $2,500.

Application must be completed before February 15. For further information and application forms, apply to the Dean of the Graduate School.

CHARLES W. HARGITT RESEARCH FELLOWSHIP IN ZOOLOGY. The Charles W. Hargitt Research Fellowship in Zoology is devoted to the promotion of research in the field of cellular studies. It may be awarded to post-doctoral candidates or established investigators who desire to engage in research and to outstanding predoctoral candidates in support of their graduate training. The recipient will be expected to engage in full-time research or training and will have no departmental duties. Research facilities will be provided. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Chairman, Hargitt Fellowship Committee, Department of Zoology.

LILLY ENDOWMENT FELLOWSHIPS IN POLITICAL SCIENCE. These fellowships are available to qualified students who seek a Ph.D. in political science and who have an interest in exploring some aspect of the relationship between Christianity and the social order. Lilly Endowment Fellows will take their minor work in the Graduate Department of Religion and will ordinarily write their dissertations in the field of political theory. The stipend is a maximum of $3,000. Appointment is for one year with the possibility of reappointment. Inquiries may be directed to Professor John H. Hallowell, Department of Political Science, Duke University, and applications should be sent to the Dean of the Graduate School.

SHELL FELLOWSHIP IN ENGINEERING. This fellowship is established to encourage graduate studies leading to an M.S. or Ph.D. degree in engineering. Preferential consideration is given to candidates in electrical or mechanical engineering with particular preference to those in an advanced stage of their work toward the doctorate. This award provides for a single student or a childless married student a one-year stipend of $1,800, for a married student with one or

more children, a stipend of $2,100. In addition, the Fellowship provides actual tuition and fees required of the recipient, a special allotment of $500 to the major department to be applied toward equipment and materials needed by the Fellow in his research, and an additional allotment of $500 to the general fund of the University. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Dean, College of Engineering.

FELLOWSHIPS AND GRADUATE SCHOLARSHIPS IN FORESTRY. Information regarding special fellowships and graduate scholarships in forestry may be obtained from the Dean of the School of Forestry, Duke University, Durham, North Carolina.

FEDERAL FELLOWSHIP PROGRAMS. In 1963-64 Duke University was approved to offer programs sustained by National Defense Act Graduate Fellowships in Economics, History, Philosophy, Physics, Romance Languages, and Sociology, and Foreign Language Fellowships. The University is approved to recommend approximately twenty applicants for Cooperative Graduate Fellowships and Summer Fellowships for Graduate Teaching Assistants offered by the National Science Foundation and to offer NASA Predoctoral Traineeships in the space sciences.

PART-TIME INSTRUCTORS. A number of departments offering graduate work make use of exceptionally qualified graduate students as part-time instructors. These students are usually able to register for a graduate program of 9 units a semester. Inquiries concerning such appointments should be directed to the Chairman of the Department concerned.

PAYMENTS TO HOLDERS OF AWARDS. Payments of stipends to all graduate students holding fellowships, scholarships, and graduate assistantships for the academic year are made by the Bursar of the University in eight monthly installments payable on the 21st of each month beginning October 21st. Arrangements may be made to prorate tuition charges on the same basis.

LOANS. The University has been allotted a sum for use under the provisions of the National Defense Act Loan fund. In addition, University funds are available to grant low-interest loans to deserving students of good academic standing. Application should be made to Mr. W. O. Petty, Jr., 102B Allen Building, Duke University.

## *Financial Regulations*

The Graduate School awards such financial aid as fellowships, scholarships, and assistantships. The several departments engage part-time instructors who may be graduate students. The Treasurer of the

University, however, has sole responsibility for paying stipends to students, collecting from them such fees as are due, and making special arrangements for prorating fees.

GENERAL FEES IN THE ACADEMIC YEAR. The following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

| | |
|---|---|
| Tuition and general fees* ($40.00 per unit) | $600.00 |
| Athletic Fee, not including federal tax, optional, per year, payable in the fall semester | 15.00 |
| Room rent (see detailed statement p. 44) | |
| Fee for Microfilming, payable by candidates for a doctoral degree when the dissertation is presented to the Graduate Office after the final examination | 25.00 |

* General fees, in lieu of most special charges, include the following fees; Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Material Fees.

Tuition and fees for a full semester program of 15 units amount to $600.00. For a part program, tuition and fees are computed at the rate of $40.00 per unit.

SPECIAL FEES FOR TEACHERS AND OTHERS. The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in *full-time* teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives of Duke faculty members, (4) *full-time* employees of Duke University who are paid on a monthly basis throughout the year. The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon payment of a fee of $5.00 for registration for each semester and a tuition fee of $15.00 per unit of credit or an audit fee of $15.00 per course. The *in absentia* fee will not be charged at this rate.

AUDIT FEE. In a semester in which a student registers and pays fees for 12 units or more, he may audit one course without charge. Should he be permitted to audit a second course or should he be registered for less than 12 units, the audit fee is $15.00 per course.

FEE ADJUSTMENT WITH CHANGE OF REGISTRATION. Arrangements made with the Bursar to prorate tuition and fee charges

do not imply that the full amount is not due and payable on the date of fall and spring registration. During the fourteen-day period for change of registration (see Change of Registration, page 21) tuition and fees will be adjusted to necessary and approved changes. After the fourteen-day period no change of tuition and fees is possible.

STIPENDS AND INCOME TAX. Ordinarily stipends awarded under fellowships and scholarships are not subject to income tax. However, a portion of the award to graduate assistants may be subject to tax. The Graduate Office will supply detailed information.

## *Living Accommodations*

The Men's Graduate Center is available to men enrolled in the graduate and professional schools. The rooms are equipped for two persons and the rental charge for a double room is $125.00 per semester for each occupant.

Epworth Hall on the Woman's College Campus is available to women enrolled in the graduate and professional schools. The rental charge for a single room is $162.50 each semester. The rental charge for a double room is $137.50 per semester for each occupant.

Duke University Apartments are available for married graduate students. The 224 units complete with basic furnishings rent per month for $70.00 for an efficiency apartment, $80.00 for a one-bedroom apartment, and $90.00 for a two-bedroom apartment. For further information on married students apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Rooms and apartments may be reserved for new applicants only if they have been accepted officially by the Graduate School of Arts and Sciences, and after the required $25.00 room deposit has been made with the Office of the Duke University Bursar. The initial room deposit is effective for room reservations for each semester of continuous residence. Applications for rooms are to be made to the Housing Bureau, Duke University, Durham, North Carolina. Rooms are rented for the academic year, but for no period of less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

Regulations governing the occupancy of rooms will be supplied directly from the Housing Bureau when the reservations are made. Occupants are expected to abide by these regulations.

DINING SERVICE. Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates $2.00 to $2.50 per day, depending upon the need and taste of the individual. The dining facilities on the West Campus

include three cafeterias with multiple-choice menus, a grill, and, in addition, the Oak Room where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 P.M. The prices are the same as in the West Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

MEDICAL CARE. The complete medical facilities of the Duke University Medical Center are available to all members of the University community. To secure the benefits of the Student Health program, a graduate student during the term or semester in which the illness occurs must 1) in the Summer Session term be registered for at least 1 unit research or 3 units of course work, 2) prior to completing minimum residence requirements be registered for at least 9 units per semester and thereafter according to the schedule on pp. 23 and 35. Students are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided for men at the Student Health Office in Duke Hospital and for women at the Woman's College Infirmary.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions, and elective surgery.

Graduate students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefit shall be applied to the cost of their medical care.

Students whose course-load entitles them to full coverage under the Student Health program are eligible for a complementary insurance policy which then comprises protection for the entire calendar year. Concerning this complementary policy inquire of the Dean of the Graduate School. *Foreign students are required to hold this or another acceptable policy.*

MOTOR VEHICLES. Each student possessing or maintaining a motor vehicle at Duke University shall register it annually at the beginning of the fall semester. If a student acquires a motor vehicle and maintains it at Duke University after enrollment, he must immediately register it. At the time of registration of a motor vehicle the following documents must be presented:

(a) State vehicle registration certificate.
(b) Valid driver's license.

(c) Satisfactory evidence of automobile liability insurance coverage with limits of at least $5,000 per person and $10,000 per accident for personal injuries, and $5,000 for property damage, as required by the North Carolina Motor Vehicle Law.

(d) If the student is under 21, a statement signed by the student's parent or guardian granting the student permission to operate a motor vehicle at Duke University.

STUDENT ACTIVITIES. Graduate students new to Duke University may be reminded that they are welcomed to use such recreation facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, drama, and religious groups. They may become junior members of the American Association of University Professors and may affiliate with Phi Beta Kappa and social fraternities.

BUREAU OF TESTING AND GUIDANCE. The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

APPOINTMENTS OFFICE. Duke University maintains an active Appointments Office which has steadily been placing students in teaching and industrial positions. The services of this office are available without charge to graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use in securing employment a complete file containing their academic record and pertinent recommendations, should register in this office.

ESTIMATED EXPENSES IN THE ACADEMIC YEAR. The necessary expenses of a graduate student are moderate. The University dormitories and Unions provide comfortable and wholesome living conditions at a minimum cost. Incidental expenses for recreation, traveling, clothes, and other items naturally depend on the tastes and habits of the individual. The table below lists the necessary *college* expenses for one academic year for a full program of work:

| | *Low* | *Moderate* | *Liberal* |
|---|---|---|---|
| Tuition and fees | $1200.00 | $1200.00 | $1200.00 |
| Room Rent | 225.00 | 250.00 | 275.00 |
| Board | 475.00 | 525.00 | 550.00 |
| Laundry | 30.00 | 40.00 | 50.00 |
| Books | 30.00 | 40.00 | 50.00 |
| | $1960.00 | $2055.00 | $2125.00 |

# Facilities for Graduate Study

## *The Libraries*

THE University Libraries contain 1,600,000 volumes. In addition to the collections in the General Library, there are eight school and departmental libraries: Divinity, 106,743 volumes; Engineering, 31,847 volumes; Law, 129,838 volumes; Medical, 72,891 volumes; Woman's College, 138,299 volumes; Biology-Forestry, 80,338 volumes; Chemistry, 20,398 volumes; Mathematics-Physics, 26,277 volumes. In 1962-63, 54,948 volumes were added; 6,000 periodicals and 118 newspapers are received currently.

The General Library building, which was doubled in size in 1949, incorporates many modern arrangements for the preservation of the collections and for the convenience of the research scholar. Book stacks, storage areas, and quarters for rare books and manuscripts are air-conditioned. In the stacks, 274 carrels are available to graduate students as places of study, and a large reading room on the first floor of the building is reserved for graduate students. Upon application, graduate students may receive permit cards entitling them to use of the stacks.

A division of photographic services, with the most modern cameras and other equipment for microfilming or other photographic reproduction of printed and manuscript materials, provides a battery of reading machines to serve the Library's large collection of microfilms of rare books, periodicals, and newspapers.

The extensive resources of the Library for research students may be suggested by the following special collections:

THE TRENT COLLECTION OF WALT WHITMAN, containing the first and all other important early editions or issues of *Leaves of Grass;* books and articles of Whitman biography and criticism; nearly 300 manuscripts and 400 letters; and pictures, sheet music, and other miscellanea.

THE GEORGE WASHINGTON FLOWERS COLLECTION of books, manuscripts, pamphlets, and newspapers on all phases of Southern history.

THE ARENTS COLLECTION of several hundred volumes relating to the culture and production of tobacco and the manufacture and distribution of tobacco products.

THE JAMES A. THOMAS COLLECTION of books on Chinese history and culture.

THE GUIDO MAZZONI LIBRARY, a collection of approximately 23,000 volumes and 67,000 pamphlets covering the whole range of Italian literature, with special strength in the nineteenth century.

THE GUSTAVE LANSON LIBRARY of 12,000 books and monographs on French literature.

LATIN-AMERICAN COLLECTIONS, built around a special Peruvian library of 7,000 books and manuscripts, a Brazilian library of several thousand volumes, and an Ecuadorian library of 2,000 volumes, supplemented by strong collections of the public documents of these and other Latin-American countries.

THE ROBERTSON LIBRARY of Philippiniana.

THE FRANK C. BROWN FOLKLORE COLLECTION, consisting of about 38,000 manuscript pieces, 1,400 vocal recordings, and 650 musical scores of North Carolina folklore.

THE STRISOWER LIBRARY of International Law, numbering about 5,000 volumes, with many rare books and periodical files.

THE TRENT COLLECTION IN THE HISTORY OF MEDICINE (Hospital Library), containing about 3,000 books and 2,500 manuscripts with special strength in anesthesia, anatomy, English medicine, vaccination, yellow fever, pharmacy, and medical biography.

THE HOLL CHURCH HISTORY LIBRARY, dealing primarily with the period of the Reformation.

THE FRANK BAKER COLLECTION OF WESLEYANA AND BRITISH METHODISM, consisting of 1,500 editions of the works of John and Charles Wesley, 8,000 volumes concerning all phases of the development of British Methodism, 4,000 volumes relating to the religious and social background of British Methodism, and 4,000 manuscript pieces by the Wesleys and their coadjutors and by British Methodists of the last 200 years.

COLLECTIONS IN ENGLISH AND AMERICAN LITERATURE, where emphasis has been placed principally on the eighteenth and nineteenth centuries, with the collections of Swinburne, Tennyson, Rossetti, and Bryant, significant groups of annotated copies and first editions of Coleridge and Byron, the Carroll Wilson collection of Emerson, some 5,000 items of eighteenth-century English poetry and prose, and the Paul Hamilton Hayne library of American literature.

In addition to these and other special collections, the Libraries contain excellent files of United States federal and state documents, public documents of many European and Latin-American countries, and publications of European academies and learned societies. The newspaper collection, with 13,250 volumes and 12,550 reels of microfilms, has several long eighteenth-century files, strong holdings of nineteenth-century New England papers, and of ante-Bellum and

Civil War papers from North Carolina, South Carolina, and Virginia; there are also many European and Latin-American papers. The manuscript collection of 3,075,064 items is particularly strong in all phases of the history, politics, and social and economic life of the South Atlantic region, though it includes also significant papers in English and American literature, and several notable medieval manuscripts in both Greek and Latin.

HISPANIC STUDIES PROGRAM. The Graduate School offers an inter-departmental program of Hispanic studies leading to the A.M. and Ph.D. degrees. Students may write their theses and take their degrees in history, economics, political science, sociology, and Hispanic languages and literatures. The purpose of the program is to make possible desirable combinations of courses on the Hispanic world in these related disciplines and to bring to bear more strength of the faculty upon the training of a single candidate. This may be achieved through a judicious use of minors or by such special arrangements as may from time to time become necessary.

The Duke University Library holdings have been built up to facilitate graduate work and research in Hispanic-American cultural history, inter-American relations, economic history, politics, and Spanish-American literature. These collections are being constantly enlarged.

## *Science Laboratories*

BOTANICAL AND ZOOLOGICAL LABORATORIES. Facilities for graduate study in the Departments of Botany and Zoology are located on the West Campus. A new Biological Sciences building, completed in 1962, contains well-equipped modern laboratories for teaching and research in the various fields of botany, forestry, and zoology. Special facilities are available, such as animal rooms, greenhouses, darkrooms, refrigerated and controlled environment laboratories, electron microscope, Van de Graaff accelerator, X-ray machine and other radiation and radioisotope equipment, and other modern research facilities.

The Botany Herbarium, containing over 200,000 specimens, is particularly strong in material from the Southeast and includes notable collections of mosses, ferns, lichens and grasses. The Biology-Forestry Library contains an outstanding collection of books and periodicals. The Library currently subscribes to over 700 journals and has 80,338 volumes. Unique assets for teaching and research are the Sarah P. Duke Gardens, conveniently located on the West Campus; the Duke Forest, comprising 7,200 acres of woodland adjacent to the West Campus; the Field Station for the Study of Animal Behavior;

and the Duke University Marine Laboratory at Beaufort, North Carolina.

Scholarships for advanced study during the summer months are maintained at the Highlands Laboratory, Highlands, North Carolina, at the Marine Biological Laboratory, Woods Hole, Massachusetts, and at the Duke University Marine Laboratory. Requests for information concerning the scholarships at the Highlands Laboratory should be addressed to the Botany Department, those concerning scholarships at the Duke Marine Laboratory and at Woods Hole to the Zoology Department.

MARINE LABORATORY. Located at Beaufort, N. C., the Duke University Marine Laboratory was founded in 1938 as a result of the efforts of the late Professor A. S. Pearse. The well-equipped facilities, including four research buildings, classrooms, running sea water, motor vessels, living quarters and food service, provide excellent opportunities for graduate courses in botany and zoology every summer and for research activities throughout the year. Ten National Science Foundation predoctoral awards and four post-doctoral awards will be offered in 1964 for course or research work at the Marine Laboratory.

For information concerning these awards or for information about courses and research space at the Duke Marine Laboratory, write to the Director, Dr. K. M. Wilbur, Department of Zoology, Duke University, Durham, N. C.

ANIMAL BEHAVIOR STATION. Located less than one mile from the campus, the 70 wooded acres of the Station provide facilities for studies of penned and free-ranging, and caged animals. These facilities include sound-proof observation chambers, barns, aviaries, and pens for large mammals and birds, and two water-fowl ponds. For information regarding research space or research assistantships in Behavior, write to Dr. P. H. Klopfer, Dept. of Zoology, or Dr. D. K. Adams, Dept. of Psychology.

PHYSICAL LABORATORIES. The Physics Building, comprising about 77,000 square feet of floor space (to be increased to 130,000 by 1964), is devoted to the research and instruction of the Departments of Physics and Mathematics.

In addition to the lecture halls and the elementary laboratories, the building includes special laboratories for work in electrical measurements, electronics, microwaves, optical spectroscopy, and atomic, nuclear, and low-temperature physics. Special research equipment includes a 21-foot concave grating and other instruments for visible, ultraviolet and Raman spectra; facilities for research in microwave spectroscopy and other high-frequency phenomena; two Van de Graaff accelerators, one 4 MEV and one high intensity 3 MEV, and associated equipment for nuclear physics research; a helium liquifier, other low

temperature equipment and three large electromagnets for nuclear resonance research below 1° Kelvin.

The Physics Building contains the Mathematics-Physics library. an IBM 7072 computer, and a shop staffed by nine instrument mechanics, seven electronics technicians, and a glass blower.

CHEMISTRY LABORATORIES. The Chemistry Building has a floor area of approximately 57,000 square feet, of which more than half is devoted to advanced teaching and research. Modern instruments are available for routine measurements, as well as for research involving ultraviolet, visible, and infrared spectroscopy. Also provided are two nuclear magnetic spectrometers, one for routine analytical purposes, and the other, a high resolution instrument, for research. In addition to extensive equipment for X-ray crystallography, facilities are available for electron spin resonance measurements, polarography, light scattering, and vapor phase chromatography.

A well-equipped shop, operated by a competent mechanic, provides facilities for the construction of special apparatus and for repair and maintenance of instruments.

The Chemistry Library, conveniently located in the building, has on its shelves over 20,400 volumes, and currently subscribes to over 200 scientific periodicals.

PSYCHOLOGY LABORATORIES. The Psychology Department occupies new and fully renovated quarters, comprising about 53,000 square feet of floor space, which house its main laboratories, seminar rooms, classrooms, and special facilities. The building is completely air-conditioned for year-round research and study. For the use of graduate students and staff, the Department now houses a periodical reference room with an extensive collection of current and bound journals and monographs in psychology and related subjects. In addition to general purpose laboratories, there are special facilities for animal behavior studies; sound-proofed and electrically-shielded rooms for use with human and animal subjects; specially equipped rooms for the study of visual perception; electrophysiological recording rooms; a histological laboratory and surgery; photographic dark rooms, etc. The social psychology unit (joint with the Department of Sociology) contains observation, communication, and recording facilities for the study of social interaction. There is an extensive suite of interview and observation rooms for the study of human personality and clinical processes. A on-line digital computer is located in the animal behavior laboratories, and automatic computation equipment is available for all research purposes. A departmental shop, with competent technicians in charge, is maintained to provide specialized mechanical and electronic apparatus. Other facilities for research and teaching are available in the laboratories and clinics of the adjacent Duke Medical Center.

A number of clinical installations for adults and children, devoted to an extensive range of clinical and guidance problems, cooperate with the department in providing facilities for research and training. In addition, the Department operates a Preschool Laboratory for four- and five-year old children. The Department cooperates with the Department of Zoology in the operation of a 70-acre field station in the near-by Duke Forest for the study of animal behavior in natural settings. (See p. 50, Animal Behavior Station.)

THE PARAPSYCHOLOGY LABORATORY. The Parapsychology Laboratory, located in West Duke Building on East Campus, is an independent research center in the University, directed by Dr. J. B. Rhine.

The purpose of the Laboratory is to advance knowledge and understanding of man's nature through research in parapsychology. No course work is offered for credit, but participation by students and others of the University community in the work of the Laboratory has been welcomed. Graduate students from this as well as from other universities have conducted thesis research projects in, or with the assistance of, the Laboratory.

The Laboratory publishes the *Parapsychology Bulletin* and members of its staff edit the *Journal of Parapsychology,* now the affiliated periodical of the Parapsychological Association.

COMPUTING LABORATORY. Since 1958 an IBM electronic computer has been available in the Computing Laboratory for instruction in modern computing methods and for research. The Computing Laboratory is under the guidance of the Department of Mathematics and is located in the Physics Building. It is being used for research in the physical sciences, mathematics, and in medical and social sciences. The Laboratory is currently equipped with an IBM 1401-7072 system. This system offers many of the most recent advances in computing equipment. Suitable auxiliary machines for processing punched cards are also provided.

## *Engineering Laboratories*

The instructional and research laboratories, together with the library, classrooms, shops, and offices, are located in the Engineering Building on the West Campus. Those engineering laboratories of particular interest to graduate students are these:

*Civil Engineering:* experimental stress analysis; hydrodynamics; materials science; sanitary engineering; soil mechanics; and structural mechanics.

*Electrical Engineering:* solid-state materials; ferromagnetics; superconducting circuits; electronics; analog computer; automatic control; energy conversion; and spacecraft electrical systems.

*Mechanical Engineering:* heat transfer; fluid mechanics, environ-

mental thermodynamics; response of physical systems; and vibration studies.

These facilities are described in the *Engineering Bulletin.*

MEDICAL SCHOOL. In the School of Medicine elaborate facilities are provided for postgraduate research in the various branches of medical science. The Departments of Anatomy, Bacteriology, Mycology and Immunology, Biochemistry and Nutrition, and Physiology and Pharmacology offer certain courses and research facilities to students in the Graduate School of Arts and Sciences. The Duke Hospital Library is available to all graduate students.

## *Duke Forest*

The Duke Forest consists of approximately 7,200 acres of land, most of which is adjacent and easily accessible to the University campus. Situated in the lower Piedmont region and composed of second-growth shortleaf pine, loblolly pine, and hardwoods, the Forest is representative of the various types of timber growth and soils found throughout the region. Through placing the Forest under intensive management for forestry purposes, substantial progress has been made in developing the educational work and research in forestry.

The proximity of the Forest to the laboratories, greenhouses, and library facilities of the University provides an excellent opportunity for advanced study and research in forestry. Research, particularly in the fields of silvics, forest soils, silviculture, forest management, properties of wood, forest-tree physiology, forest entomology, and forest pathology, is well under way. Several members of the botany and zoology staffs are also engaged in research in the Duke Forest.

## *Forest Science Laboratory*

The establishment of the Forestry Sciences Laboratory research facility of the Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the Department of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The staff of the Laboratory is available for consultation, participation in seminars and may offer advice to students conducting research in the Department of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

## *Commonwealth-Studies Center*

The Commonwealth-Studies Center was established at Duke University in 1955 and has received financial support from the Carnegie

Corporation of New York, the Rockefeller Foundation, and the Ford Foundation. Its objectives are:

1. to encourage and stimulate by financial assistance and other means the research interests of individual scholars in Commonwealth fields,
2. to establish at Duke University a Center whose facilities will promote interest in research relating to the Commonwealth, provide the materials for basic research, and encourage research by Commonwealth and American students and faculty, and
3. to provide financial support for the systematic training of graduate students from Commonwealth countries at Duke University in the disciplines of economics, history, and political science.

The Center supports the University's graduate program in several ways. It has awarded fellowships to over forty graduate students from Australia, Canada, and New Zealand who have studied for the Ph.D. degree in economics, history, or political science at Duke University. Of this number twenty have already received their doctorates. National selection committees in each of the mentioned countries facilitate the selection of graduate students for fellowships and study at Duke University.

Each spring the Center sponsors a joint seminar for graduate students in economics, history, and political science, which focuses either on a geographical area of the Commonwealth or on certain political, economic, and social phenomena and developments within the Commonwealth. To date more than seventy students have participated in the seminar. In addition the Center sponsors occasional lectures at the University by distinguished Commonwealth scholars.

Research relating to the Commonwealth is undertaken by the members of the Committee on Commonwealth Studies and financial assistance is also provided to students and faculty at the University for field research in Commonwealth countries. Studies resulting from research sponsored by the Center are frequently published by the Duke University Press in the Commonwealth-Studies Series, which at the end of 1963 included nineteen volumes. The Center also distributes in its reprint series selected published articles that relate to the Commonwealth.

## *Program in Comparative Studies on Southern Asia*

The Program in Comparative Studies on Southern Asia was established at Duke University in 1961 following a grant from the Ford Foundation to the Commonwealth-Studies Center to enable it to develop a research and training program on that area. The basic

purpose of this program is twofold: to facilitate research on the political and economic development of Commonwealth countries of Southern Asia (India, Pakistan, Ceylon, and Malaysia), and to provide for the systematic training of graduate students in anthropology, economics, history and political science, with special emphasis on that area.

Although responsibility for approving basic policies for the Program in Comparative Studies on Southern Asia rests with the Committee on Commonwealth Studies, a subcommittee has authority to make recommendations on policy matters and to carry out the operations of the Program.

Graduate students participating in the program pursue studies looking to the Ph.D. degree in anthropology, economics, history, or political science. They are enrolled in the respective departments and must meet all the departmental requirements for the doctorate. In addition it is expected that students will take Hindi and Urdu and cognate courses in other departments.

In 1963 the University concluded a contract with the United States Office of Education for the establishment at Duke University of a language and area training center in Hindi and Urdu under the provisions of Title VI of the National Defense Education Act. As a result of the financial support of that office, the University has increased the course offerings in Hindi and Urdu by adding a third-year course of intensive Hindustani and enlarging its language staff.

The Program awards each year a limited number of pre-doctoral fellowships for graduate students pursuing the Ph.D. degree program in the mentioned disciplines. Graduate students interested in Southern Asia also may apply for NDEA Title VI language fellowships, which are awarded by the United States Office of Education. Recipients of such fellowships must take the Hindustani courses offered at Duke University; they may pursue the Ph.D. degree program in anthropology, economics, history, or political science.

Under the Program's auspices an interdepartmental seminar for graduate students in anthropology, economics, history, and political science is usually offered in the Spring Semester. Senior Commonwealth and American scholars present papers at the seminar and provide valuable cross cultural and interdisciplinary contacts for the graduate students.

Facilitation and support of research activities by members of the Duke University faculty and graduate students is an important aspect of the Program's activities. It supports through travel grants and subsistence allowances field research by persons affiliated with the University; the research must relate to the political problems of economic development and the historical factors pertinent to the transition from colonial to independent status. Research grants for

faculty and students are also available from the American Institute of Indian Studies, the United States Office of Education, and the Social Science Research Council.

It is expected that all candidates for the Ph.D. degree participating in the Program will undertake field research in the preparation of their dissertation.

The Executive Secretary for the Commonwealth-Studies Center and the program in Comparative Studies on Southern Asia is Dr. Don C. Piper.

## *Oak Ridge Institute of Nuclear Studies*

Duke University is one of the sponsoring universities of the Oak Ridge Institute of Nuclear Studies located at Oak Ridge, Tennessee. The graduate research program at Duke has available to it all the facilities of the Oak Ridge National Laboratory and the cooperative supervision of student research by the staff at Oak Ridge.

Fellowships in several fields of science are available to qualified applicants.

GRADUATE FELLOWSHIP PROGRAM. On application by a university the Institute awards fellowships to candidates for the master's and doctor's degree, after the student has completed all the course requirements for the degree. The student uses the fellowship to conduct his thesis research in an Oak Ridge laboratory.

AEC SPECIAL FELLOWSHIPS. These are available in the fields of (1) Nuclear Science and Engineering, (2) Health Physics, (3) Advanced Training in Health Physics, and (4) Industrial Hygiene.

The application deadlines differ for different fellowships. Further information may be obtained from Karl M. Wilbur, Department of Zoology.

## *Cooperative Programs with the Consolidated University of North Carolina*

INTERCHANGE OF REGISTRATION. (See pp. 22-23.)

LIBRARY EXCHANGE. Students of both the University of North Carolina and Duke University are granted certain library privileges in the respective libraries of each University. Books unavailable in one library may be procured at short notice through an interlibrary loan service.

## *Research and Publications*

The several departments of the University are devoted to research as well as to instruction. Since the University exists for the promotion and diffusion of knowledge, attention is rightly placed, in the Graduate School, on research activities.

In furtherance of the University's obligation to promote and diffuse knowledge, the President annually appoints a University Council on Research, which receives applications from members of the various faculties for subsidies in support of research. Vigorous and forward-looking policies of this Research Council have initiated and encouraged the completion of many substantial and important research projects.

The Duke University Press takes its place as a significant agency in the diffusion of knowledge. Created in 1925, as a successor to the Trinity College Press, the Duke University Press continued the publication of the *South Atlantic Quarterly,* published at Trinity College since 1902, and in 1926 revived the *Hispanic-American Historical Review,* which had been founded and published from 1918 to 1922 by a group of scholars interested in Hispanic America. In 1929 *American Literature* was begun with the cooperation of the American Literature Group of the Modern Language Association. This journal was followed in 1931 by *Ecological Monographs,* and in 1932, *Character and Personality* (since 1945 the *Journal of Personality*). In 1935 the Press began the publication of the *Duke Mathematical Journal.* Since 1948, it has published *Ecology,* the official journal of the Ecological Society of America. The Law School of Duke University publishes *Law and Contemporary Problems, The Duke Bar Journal,* and *The Journal of Legal Education. The Journal of Parapsychology* has been published at Duke since 1937.

The Press, since its organization, has published more than three hundred and twenty-five volumes, including four series of monographs, and has thus made public the fruits of scholarly research of the Duke faculty and of scholars elsewhere. In the broadest sense, the policy of the Press is to make available to the public any scholarly work that merits publication though special attention is given to works in domains of knowledge cultivated by the University.

## *Visiting Scholars*

The libraries and, to the extent practicable, other facilities of Duke University will be made available to faculty members of colleges and universities who wish to spend a period of time on the campus in pursuit of their scholarly interests. No fees will be charged such visitors unless they wish to participate in activities for which a special fee is assessed. Room and board may be arranged for at the regular rates in the dormitories and dining rooms. Dormitory space is usually available during the summer months. Inquiries concerning residence for visiting scholars should be directed to the Dean of the Graduate School of Arts and Sciences.

# *Graduate Study in the Summer Session*

The Summer Session of Duke University is divided into two terms. In 1964 the first term will begin on June 10 and will end on July 15. The second term will begin on July 17 and will end on August 21.

Graduate students who wish to work toward advanced degrees in the Summer Session, particularly in chemistry, economics, education, English, history, mathematics, religion, sociology, Spanish, and zoology, will find a selection of courses offered by members of the Duke faculty and by visiting professors. Other departments ordinarily offering work leading to the A.M. degree are botany, political science, and psychology. Thesis research for advanced graduate students is available also in other departments, such as botany, forestry, and physics.

Requirements for admission to the Graduate School are detailed above. Students who wish to be admitted to the Graduate School for work in the Summer Session should make application to the Dean of the Graduate School, as well as to the Director of the Summer Session, and should return the completed application, with supporting documents, before May 10, for admission to the first term, and before June 17, for admission to the second term.

REGULATIONS REGARDING SUMMER WORK. (a) No graduate student may register for more than six units of credit in one Summer Session term. (b) All of the work required for the A.M., M.A.T., or M.Ed. degree must be completed within six years of the date of beginning. (c) Not more than one year of summer work can be accepted toward the residence requirements beyond the minimum for the Ph.D. or Ed.D. degrees. See p. 24 for a definition of a year's residence credit earned in Summer Sessions. Students who complete in a summer session the work required by the University for the Master's degree will be granted the degree at the end of the summer.

A Summer Session Bulletin containing information about graduate courses may be obtained by addressing a request to the Director of the Summer Session, Duke University, Durham, N. C.

# Courses of Instruction

In general, courses with odd numbers are offered in the fall semester, those with even numbers in the spring semester. Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course, credit may be received for either semester without special permission.

Normally, courses which bear no date are offered every year; those marked with an asterisk are offered only when the need arises.

**Note: In each department the number 399 is reserved to designate special (individual readings in a specified area and supervised by a regular member of the Graduate staff, credit 1-3 units each registration, 9 units maximum in three successive registrations. The course is restricted to resident doctoral programs, should have a completion exercise, and must carry a grade. When used it appears in this form: [Department] 399, Special Reading in [area], (Instructor), [2 or 3] units.**

## ANATOMY

PROFESSOR MARKEE, CHAIRMAN; ASSOCIATE PROFESSOR DUKE, DIRECTOR OF GRADUATE STUDIES—431 MEDICAL SCHOOL; PROFESSORS EVERETT, HETHERINGTON AND PEELE; ASSOCIATE PROFESSORS BECKER AND MOSES

The Department of Anatomy offers graduate courses and training leading to the A.M. and Ph.D. degrees. Further information may be obtained from the Director of Graduate Studies of the department. (See MEDICAL SCHOOL, p. 116.)

M201. ANATOMY AS RELATED TO LOCOMOTION.—Complete dissection of that part of the body concerned with locomotion and posture. (See also Course M205). September to January. Prerequisite: One year each of biology, chemistry, and physics. 6 units.

PROFESSORS MARKEE AND EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M202. MICROSCOPIC ANATOMY.—Conferences and laboratory work on the morphological characteristics of the tissues of the animal body. The work is based upon a study of fresh and prepared material and is approached from the physiological viewpoint. Sept. to Jan. Hours and credits (maximum 3 units) by arrangement. Prerequisite: adequate training in histology or cytology.

PROFESSORS MARKEE, HETHERINGTON, AND EVERETT; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M203. ANATOMY OF THE NERVOUS SYSTEM.—A study of the gross and microscopic structure of the human central nervous system, special attention being paid to the structural and functional relationships between the various nuclei and fiber tracts. Feb. to June. Hours and credits (maximum 4 units) by arrangement. Prerequisite: Anatomy M201.

PROFESSORS MARKEE, EVERETT, AND PEELE; ASSOCIATE PROFESSORS BECKER AND DUKE

M204. NEUROANATOMICAL BASIS OF BEHAVIOR.—A study of the gross and microscopic anatomy of the nervous system with emphasis on the structural and functional relationship between tracts, nuclei, and cortical areas. Restricted to graduate students with the equivalent of a major in psychology. (Jan. to June) 3 units.

PROFESSORS HETHERINGTON AND PEELE

M205. ANATOMY OF THE VISCERA.—This is a study of the Gross Anatomy of the thoracic, abdominal and pelvic organs and the deeper structures of the head. This course may be taken concurrently with M201. Sept. to Jan. Prerequisites one year each of physiology, chemistry, and physics. 2 units.

PROFESSORS MARKEE, EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M301. GROSS HUMAN ANATOMY.—A course especially for Ph.D. candidates in Anatomy, comprising a complete dissection of the cadaver. The laboratory work is supplemented by conferences which place emphasis on the biological aspects of the subject. Sept. to June. Hours and credits (maximum 8 units) by arrangement. Prerequisite: adequate training in comparative anatomy and embryology.
PROFESSORS MARKEE AND EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M312. RESEARCH.—Individual investigations in the various fields of anatomy. Credits to be arranged. PROFESSORS MARKEE, EVERETT, HETHERINGTON, AND PEELE; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M313-314. ANATOMY SEMINAR.—Weekly meeting of graduate students and staff in which current research problems in Anatomy will be presented. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units. Sept. to Jan. PROFESSORS MARKEE, EVERETT, HETHERINGTON, AND PEELE; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M404. INTERDISCIPLINARY SEMINAR IN THE PHYSIOLOGICAL AND ANATOMICAL BASES OF BEHAVIOR.—Weekly meeting of graduate students and staff in which current problems in Anatomy, Physiology, and Psychology Behavior will be presented. Many of the presentations will be made by visiting scholars who will also be available for small group discussions. (Also listed as Physiology M404 and Psychology 404). 1 unit. Feb. to June.
PROFESSORS MARKEE, HALL, ZENER, AND PEELE; ASSOCIATE PROFESSORS BECKER AND DIAMOND

## ART

PROFESSORS HALL AND PATRICK; VISITING BENJAMIN N. DUKE PROFESSOR OF ART BIER; ASSOCIATE PROFESSORS MARKMAN AND SUNDERLAND

No graduate degree is offered in this department, but the following courses are suggested as possible minors for students majoring in history, literature, philosophy, religion, psychology, or sociology, or in any other interested department.

215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—A specialized study of the development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part of Syria and Palestine, to the Persian conquest. 3 units.* (W) ASSOCIATE PROFESSOR MARKMAN

216. RELIGIOUS ART OF THE CLASSICAL WORLD.—A specialized study of the religious art, particularly architecture and sculpture, of Greece and Rome, with special emphasis on the monuments in the Near East. 3 units* (W)
ASSOCIATE PROFESSOR MARKMAN

217. AEGEAN ART.—A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 2 units. (W) ASSOCIATE PROFESSOR MARKMAN

218. EARLY GREEK ART.—A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 units. (W)
ASSOCIATE PROFESSOR MARKMAN

221-222. HISTORY OF AESTHETICS.—Theories of art and beauty in the western world from antiquity to the present. Some attention will be given to the developed theories of aesthetics in the Far East. 6 units. (E) PROFESSOR PATRICK

233. EARLY MEDIAEVAL ARCHITECTURE.—The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 units. (E)
ASSOCIATE PROFESSOR SUNDERLAND

234. ROMANESQUE SCULPTURE.—The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 units. (E)
ASSOCIATE PROFESSOR SUNDERLAND

236. GOTHIC SCULPTURE.—Tilman Reimenschneider and the late Gothic German sculpture, comparing his work with that of other artists of the period. 3 units.* (E)
VISITING B. N. DUKE PROFESSOR BIER

239. ARCHITECTURE OF BRITAIN.—After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 units. (E) ASSOCIATE PROFESSOR HALL

240. ARCHITECTURE OF NORTH AMERICA.—A study illustrating the transplantation of European architectural customs since the sixteenth century; the time-lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 units. (E) ASSOCIATE PROFESSOR HALL

292. RESEARCH PROBLEMS IN THE COLLECTIONS OF THE NORTH CAROLINA MUSEUM OF ART.—Students will meet once every week in the museum in Raleigh. Each student will submit a report on his particular research project. 3 units.* (E) VISITING B. N. DUKE PROFESSOR BIER

## BIOCHEMISTRY AND NUTRITION

PROFESSOR HANDLER, CHAIRMAN—237 BELL BUILDING; ASSOCIATE PROFESSOR BYRNE, DIRECTOR OF GRADUATE STUDIES—218 BELL BUILDING; PROFESSORS TANFORD AND WYNGAARDEN; ASSOCIATE PROFESSORS F. BERNHEIM, DAVIDSON, GUILD, HILL, KAMIN, LYNN, MCCARTY, THIERS, AND WAKIL; ASSISTANT PROFESSORS FRIDOVICH, GREENE, KIRSHNER, AND WHEAT; ASSOCIATE ROSETT

(See MEDICAL SCHOOL, p. 116.)

In the Department of Biochemistry graduate work is offered leading to the Ph.D. degree. A brochure may be requested from the department which describes the departmental facilities, the staff, the Ph.D. program, the special trainee stipends which are available to Ph.D. candidates in Biochemistry, and an M.D.-Ph.D. program.

Prerequisites are specified for each course, but interested students who cannot meet the requirements may be admitted by permission of the instructor.

### FOR SENIORS AND GRADUATES

201. INTRODUCTORY BIOCHEMISTRY.—Three lectures and one conference per week. A rigorous introduction to fundamental aspects of biochemistry which emphasizes chemistry of biologically occurring macromolecules, mechanism of enzyme action, energy transformations, metabolic pathways, and biochemical genetics. 4 units. PROFESSOR HANDLER

203. CHEMISTRY OF NATURAL PRODUCTS.—This course will emphasize the organic chemistry of carbohydrates, lipids and steroids; aspects of stereochemistry, conformational analysis and physical methods of structural investigation will be discussed. Prerequisite: chemistry through organic; Biochemistry 201 or its equivalent is suggested. 2 units. ASSOCIATE PROFESSOR DAVIDSON

206. LABORATORY METHODS IN BIOCHEMISTRY.—A laboratory course emphasizing the procedures and instruments of biochemical research. Each technique is employed in the course of a classical experiment demonstrating an important biochemical finding. Because the experimental materials are labile, one full day per week is spent in the laboratory. Prerequisite: Biochemistry 201 or equivalent. 2 units. ASSOCIATE ROSETT

### FOR GRADUATES

301. ENERGY METABOLISM.—A lecture and seminar course on the metabolism of carbohydrates, lipids and biological oxidations; emphasizing energy production and utilization. Prerequisites: Biochemistry 201, 203 suggested. 3 units.
ASSOCIATE PROFESSOR WAKIL AND ASSISTANT PROFESSOR WHEAT

302. NITROGEN METABOLISM.—An intensive study, in lecture and seminar, of the metabolism of inorganic nitrogen compounds, proteins, and their component amino acids. Prerequisite: Biochemistry 201. 2 units. (Not 1964-65)
ASSOCIATE PROFESSOR KAMIN AND ASSISTANT PROFESSORS KIRSHNER AND GREENE

304. PROTEINS AND ENZYMES.—The chemical and physical properties of proteins and enzymes. Thermodynamics, kinetics, and mechanisms of enzyme-catalyzed reaction. Prerequisites: Biochemistry 201 and physical chemistry equivalent to Chemistry 261-262. 4 units.

PROFESSOR TANFORD AND ASSOCIATE PROFESSORS HILL AND BYRNE

314. NUCLEIC ACIDS AND GENETIC MECHANISMS.—A lecture and seminar course on nucleic acids in biology with emphasis on the physical and chemical basis of their role as the structural units of heredity. Prerequisite: Biochemistry 201; 203 is suggested. 2 units. ASSOCIATE PROFESSOR GUILD

345-346. SEMINAR.—Required of all graduate students majoring in biochemistry. 1 unit each semester. ASSISTANT PROFESSOR FRIDOVICH

348. SPECIAL TOPICS.—A lecture series on topics of current interest in biochemistry. 1 or 2 units. ASSOCIATE PROFESSOR MCCARTY

## BOTANY

ASSOCIATE PROFESSOR JOHNSON, CHAIRMAN, 141 BIOLOGICAL SCIENCES BUILDING; PROFESSOR BILLINGS, DIRECTOR OF GRADUATE STUDIES, 142 BIOLOGICAL SCIENCES BUILDING; PROFESSORS ANDERSON, HARRAR, KRAMER, NAYLOR, OOSTING, AND PERRY; ASSOCIATE PROFESSORS HUMM, PHILPOTT, AND WILBUR; ASSISTANT PROFESSORS CULBERSON, STONE, AND WHITE

Graduate work in the Department of Botany is offered leading to the A.M. and Ph.D. degrees. Before undertaking graduate study in botany a student should have had in his undergraduate program at least 12 semester hours of botany beyond an elementary course, and related work in biological sciences. Some work in chemistry and physics will be desirable and, for some phases of botanical study, a necessity. The student's graduate program is planned to provide a broad basic training in the various fields of botany, plus intensive specialization in the field of the research problem.

202. GENETICS.—The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. Offered in alternate years. Prerequisites: one year of botany, zoology, or equivalent, and college algebra. 4 units. (Not 1964-65) PROFESSOR PERRY

203. PLANT CYTOLOGY.—A study of the structure and organization of plant cells in relation to growth, reproduction, and especially heredity. Prerequisite: one year of botany. (This is the same course as Zoology 243.) 4 units

PROFESSOR ANDERSON

204. ADVANCED PLANT ANATOMY.—A study of vegetative and reproductive tissue of vascular plants including selection and preparation of fresh plant materials. An analysis of some of the significant literature bearing upon function, development, and phylogeny. Prerequisite: Botany 55 or equivalent. 4 units.

ASSISTANT PROFESSOR WHITE

221. INTRODUCTORY MYCOLOGY.—Field and laboratory study of the vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: a year of biological science. 4 units.

ASSOCIATE PROFESSOR JOHNSON

225-226. SPECIAL PROBLEMS.—Students with adequate training may do special work in the following: (1) Mycology and Plant Pathology, (2) Cytology, (3) Ecology, (4) Genetics, (5) Morphology and Anatomy of Higher plants, (6) Morphology and Taxonomy of Lower Groups, (7) Physiology, (8) Taxonomy of Higher Groups, (9) Microbiology, (10) Experimental Taxonomy. Credits to be arranged.

ALL MEMBERS OF THE GRADUATE STAFF

240. PLANT EVOLUTION.—Microevolutionary change and factors influencing its rate and direction, with primary emphasis on examples from the plant world. 3 units. ASSISTANT PROFESSOR STONE

252. PLANT METABOLISM.—The physio-chemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 units. PROFESSOR NAYLOR

254. PLANT-WATER RELATIONS.—A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 units. PROFESSOR KRAMER

255. ADVANCED TAXONOMY.—A study of the historical background of plant taxonomy, modern concepts and systems of classifications, nomenclatorial problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 units. ASSOCIATE PROFESSOR WILBUR

256. COMMUNITY ANALYSIS AND CLASSIFICATION.—The development of concepts and methods in synecology and their present application to the study of plant communities. Prerequisite: Botany 156 or equivalent. 3 units. PROFESSOR OOSTING

257. PRINCIPLES OF PLANT DISTRIBUTION.—Interpretation of the floristic and ecological plant geography of the world's vegetation. Prerequisite: Botany 156 or equivalent. 3 units. (Not 1964-65). PROFESSOR BILLINGS

258. PHYSIOLOGY OF GROWTH AND DEVELOPMENT.—Consideration of the internal factors and processes of new protoplasm and its differentiation at the cellular, tissue, and organ level in plants. Prerequisites: Botany 151 or equivalent; organic chemistry recommended. 4 units. PROFESSOR NAYLOR

259. THE ENVIRONMENT.—Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 units. PROFESSOR BILLINGS

260. LICHENS.—The morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 2 units. ASSISTANT PROFESSOR CULBERSON

305. VEGETATION OF NORTH AMERICA.—Distribution and limits of the major plant communities, a study in ecological plant geography. Prerequisite: Botany 156 or equivalent. 3 units. (Not 1964-65) PROFESSOR OOSTING

310. BRYOPHYTES.—The morphological and systematic characteristics of mosses and liverworts. 2 units. (Not 1964-65) PROFESSOR ANDERSON

311. ALGAE.—The morphological and ecological characteristics of the common freshwater and marine species and the principles underlying their classification. Collecting, identification, and the making of permanent microscopical preparations. 2 units. ASSOCIATE PROFESSOR HUMM

359-360. RESEARCH IN BOTANY.—Individual investigation in the various fields of botany. Credits to be arranged. ALL MEMBERS OF THE GRADUATE STAFF

### FOREST BOTANY

FOR SENIORS AND GRADUATES

253. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisite: one year of botany. 3 units. PROFESSOR HARRAR

RELATED COURSE IN OTHER DEPARTMENTS

This related course may be counted toward a major in botany: Forestry 257.

## CHEMISTRY

PROFESSOR SAYLOR, CHAIRMAN—115 CHEMISTRY BUILDING; PROFESSOR BRADSHER, DIRECTOR OF GRADUATE STUDIES—124 CHEMISTRY BUILDING; PROFESSORS BROWN, GROSS, HAUSER, HILL, HOBBS, KRIGBAUM, AND WILDER; ASSOCIATE PROFESSORS POIRIER, QUIN, SMITH, AND STROBEL; ASSISTANT PROFESSORS JONES, TOREN, AND WELLS; ADJUNCT PROFESSORS PETERLIN AND STANNETT

In the Department of Chemistry graduate work is offered leading to the A.M. and Ph.D. degrees. Before undertaking a graduate program in chemistry, a student

should have taken an undergraduate major in chemistry, along with related work in mathematics and physics.

Graduate courses in the department are designed to provide a broad basic training in the fields of inorganic, organic, analytical, and physical chemistry. An important requirement for the Ph.D. degree is the successful completion, under the direction of a member of the staff, of a research program leading to the solution of an original problem. The choice of the research problem, for either the A.M. or the Ph.D. degree, will determine the field of advanced specialization.

FOR SENIORS AND GRADUATES

206. ELEMENTS OF THEORETICAL CHEMISTRY.—A one-semester course in the general principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitations and three laboratory hours. Prerequisites: quantitative analysis, organic chemistry 8 units; physics 8 units, and introductory calculus. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 units. PROFESSOR SAYLOR

215. ADVANCED INORGANIC CHEMISTRY.—A study of modern theories of valence and molecular structure and inorganic compounds, particularly the less common types. Prerequisite: Physical Chemistry. 3 units. PROFESSOR HILL

216. NUCLEAR CHEMISTRY.—Elementary theory of nuclear reactions, properties of isotopes, and tracer techniques. Two lectures and three laboratory hours. Prerequisites: Introductory physics, analytical and organic chemistry. 3 units. PROFESSOR HILL

234. CHEMICAL INSTRUMENTATION.—Discussion of physico-chemical principles as applied to instrumental methods of analysis, illustrated by laboratory experiments with emphasis on methods involving electrical techniques. One lecture and three laboratory hours per week. Prerequisites: quantitative analysis and physical chemistry; the latter may be taken concurrently. 2 units. ASSOCIATE PROFESSOR STROBEL AND ASSISTANT PROFESSOR TOREN

251. QUALITATIVE ORGANIC ANALYSIS.—Systematic identification of organic compounds, including a study of solubilities and classification reactions. One lecture and three or six laboratory hours per week. Prerequisites: quantitative analysis and 8 units of organic chemistry. 2 or 3 units. PROFESSOR HAUSER

252. ADVANCED ORGANIC PREPARATIONS.—A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory exercises accompanied by oral discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture, with lectures in alternate weeks. Prerequisites: quantitative analysis and 8 units of organic chemistry. 2 units. PROFESSOR BROWN

253. INTERMEDIATE ORGANIC CHEMISTRY.—An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: 8 units of organic chemistry. 3 units. PROFESSOR WILDER

271. INTRODUCTION TO RESEARCH.—Lectures on the use of chemical literature, research methods, recording and publication of results, and other topics. One lecture per week. 1 unit. PROFESSOR BROWN

275, 276. RESEARCH.—The aim of this course is to give instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units. ALL MEMBERS OF THE GRADUATE STAFF

FOR GRADUATES

303. THERMODYNAMICS.—Fundamental laws of thermodynamics and their application to chemistry. Prerequisites: Physical chemistry and one year of calculus. 3 units. PROFESSOR SAYLOR

304. PHYSICAL CHEMISTRY OF REACTIONS.—The theoretical aspects of reaction kinetics, chemical equilibrium, atomic and molecular forces, and the relation of these to chemical reactions are considered. Prerequisite: Physical chemistry. ASSOCIATE PROFESSOR SMITH

331, 332. SEMINAR IN ANALYTICAL AND INORGANIC CHEMISTRY.—Lectures, oral reports, and discussion on advanced topics and recent advances in the

allied fields of analytical and inorganic chemistry. Prerequisites: Chemistry 215 and 234. 2 units. PROFESSORS HILL AND SAYLOR

342. ADVANCED ORGANIC CHEMISTRY.—Consideration is given to principles, theories and mechanism, as well as the usefulness in reactions, of organic reactions involving basic and acidic reagents. Prerequisite: Chemistry 253. 2 units. PROFESSOR HAUSER

350. ORGANIC REACTIONS.—A study of the scope and limitations of the more important types of reactions of organic chemistry from the point of view of their practical use in the synthesis of organic compounds. Prerequisite: Chemistry 253. 2 units. (Spring 1965) PROFESSOR BRADSHER

352. MECHANISMS OF ORGANIC REACTIONS.—Mechanisms of various organic reactions are considered. Lecture or seminar one hour each week. Prerequisite: Chemistry 342. 1 unit. PROFESSOR HAUSER

353. SPECIAL TOPICS IN ORGANIC CHEMISTRY.—Various topics of interest to the organic chemist will be surveyed such as the chemistry of heterocyclic compounds, organometallic and organometalloid chemistry, terpenes, sesquiterpenes and steroids, small ring compounds, ring formation and transannular interactions. 2 units. ASSOCIATE PROFESSOR QUIN

354. STEREOCHEMISTRY.—A study of recent advances in stereochemistry of organic compounds including conformations and stereospecific reactions. The use of spectrophotometric methods for the determination of structure will be discussed. Prerequisites: Chemistry 251 and 341. 2 units. (Not 1964-65) PROFESSOR WILDER

360. POLYMER CHEMISTRY.—A survey of the methods of preparation of high-molecular-weight organic compounds and a study of the properties characteristic of macromolecules in solution and in the solid state. Prerequisite: Chemistry 303. 2 units. ASSOCIATE PROFESSOR KRIGBAUM

361. ADVANCED POLYMER CHEMISTRY.—A number of topics in the chemistry and physics of high polymers will be discussed, including polymerization mechanisms and kinetics, crystallization and morphology of high polymers and solution properties. Prerequisite: Chemistry 360. 2 units. ADJUNCT PROFESSORS PETERLIN AND STANNETT

363, 364. SPECIAL TOPICS IN PHYSICAL CHEMISTRY.—Various topics in Physical Chemistry which are of special interest to the staff or students are considered such as absorption and scattering of light, dielectric phenomena, electrode processes, electrolyte theory ion exchange, molecular structure and solubility. Seminar. Prerequisites: Physical chemistry and Chemistry 303. PROFESSORS GROSS, HILL, HOBBS, AND SAYLOR; ASSOCIATE PROFESSORS SMITH, KRIGBAUM, POIRIER, AND STROBEL

365, 366. CHEMICAL PHYSICS, STATISTICAL THEORY.—General introduction to classical and quantum statistical mechanics and applications to chemical problems including: calculation of thermodynamic functions of gases, liquids and solids; solution theory; reaction velocity; and changes of state. 6 units. (365, Not 1964-65; 366, Fall 1964-65) ASSOCIATE PROFESSOR POIRIER

367, 368. CHEMICAL PHYSICS, QUANTUM THEORY.—General introduction of the quantum theory of atomic and molecular forces and the structure of matter. 6 units. (367, Spring 1964-65; 368, Not 1964-65) ASSISTANT PROFESSOR JONES

373, 374. SEMINAR.—Required of all graduate students in chemistry. One hour a week discussion. 2 units. ALL MEMBERS OF THE GRADUATE STAFF

## CLASSICAL STUDIES

PROFESSORS ROGERS, TRUESDALE, AND WILLIS

### GREEK

FOR SENIORS AND GRADUATES

201-202. GREEK TRAGEDY. 6 units.* PROFESSOR TRUESDALE

257. SOCIAL AND CULTURAL HISTORY OF THE HELLENISTIC WORLD

FROM ALEXANDER TO AUGUSTUS.—Lectures, reading, and discussions. This course will not be separately credited without the sequel, Latin 258. 3 units.
PROFESSOR ROGERS

Graduate students of Duke University may attend the American School of Classical Studies in Athens, Greece, without charge for tuition, and they are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology, and one in the language, literature, and history of ancient Greece, each with a stipend of $2,000. They are awarded mainly on the basis of examination held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.

### LATIN

FOR SENIORS AND GRADUATES

211-212. ROMAN ORATORY.—A survey of the history of Roman oratory, centering about the *Brutus* of Cicero and Tacitus' *Dialogus*. 6 units.*
PROFESSOR ROGERS

258. SOCIAL AND CULTURAL HISTORY OF THE GRAECO-ROMAN WORLD.—The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues Greek 257 and will not be separately credited. 3 units.
PROFESSOR ROGERS

RELATED COURSES IN OTHER DEPARTMENTS

Philosophy 217; Religion 217, 313, 316, 318.

Under the terms of a co-operative agreement graduate students of Duke University may, with the approval of the chairman of their major department, take any graduate course offered by the Department of Greek and Latin of the University of North Carolina by the payment of a nominal fee. A list of these courses will be sent upon request.

## COMPARATIVE LITERATURE

No graduate degree is offered in Comparative Literature. The following courses may serve in the minor programs of students in other departments. Professor Salinger is Chairman of the Department of Germanic Languages and Literature.

201, 202. ROMANTICISM.—Studies in the origin, rise and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany with some reference to other countries. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units. (1964-65)
PROFESSOR SALINGER

203, 204. REALISM AND SYMBOLISM.—Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy, tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units. (Not 1964-65)
PROFESSOR SALINGER

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 3 units. (1964-65)
PROFESSOR SALINGER

## ECONOMICS

PROFESSOR DE VYVER, CHAIRMAN—307 SOCIAL SCIENCE; PROFESSOR SMITH, DIRECTOR OF GRADUATE STUDIES—304 SOCIAL SCIENCE; PROFESSORS BLACK, FERGUSON, HANNA, HOOVER, LANDON, MCGEE, AND SPENGLER; ASSOCIATE PROFESSORS DAVIES, GERHARD, GOODWIN, AND YOHE; ASSISTANT PROFESSORS DE ALESSI AND WALLACE

The Department of Economics offers graduate work leading to the A.M. and Ph.D. degrees. A student entering graduate work in economics should have com-

pleted with satisfactory grades at least 12 semester hours of undergraduate work in economics, including 6 hours of Principles of Economics. Among the undergraduate courses of distinct advantage to the graduate student in economics are General Accounting, Elementary Statistics, Intermediate Economic Theory, Money and Banking, International Trade, and basic courses in philosophy, psychology, mathematics, and social sciences other than economics.

Requirements for the Ph.D. in economics include a core of courses in Mathematical Economics, Statistical Methods, Micro- and Macro-economic Theory, Economic History, and the History of Economic Thought. Economic Growth and Demography, Money and Banking, International Trade, Economic Systems, Labor Economics, Public Finance, and Industrial Organization are optional fields, of which the student elects at least three in preparation for the preliminary doctoral examination. Course requirements for the Ph.D., including a minor field, may be completed in four semesters of residence.

FOR SENIORS AND GRADUATES

218. BUSINESS CYCLES.—The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories; modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 units.† ASSOCIATE PROFESSOR YOHE

233. STATE AND LOCAL FINANCE.—A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. 3 units.† ASSOCIATE PROFESSOR DAVIES

237-238. STATISTICAL METHODS.—A study of statistical methods appropriate for dealing with problems in business and the social sciences. In addition to developing more thoroughly the subject considered in *Business Statistics,* the following methods will be considered: multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the instructor. Either semester may be taken for credit. 6 units. PROFESSOR HANNA AND ASSISTANT PROFESSOR WALLACE

262. TRADE UNIONISM AND COLLECTIVE BARGAINING.—An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. 3 units.† PROFESSOR DE VYVER

265. INTERNATIONAL TRADE AND FINANCE.—A study of the fundamental principles of international trade and foreign exchange. Subjects covered will include international specialization, balance of payments, foreign investments, tariffs and commercial policies, exchange control, exchange rates, and international monetary problems. 3 units.† ASSOCIATE PROFESSOR GERHARD

275-276. ADVANCED INDUSTRIAL ACCOUNTING AND MANAGEMENT.—A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices followed by job-order, process, and standard costing, as well as the economics of overhead costs. Prerequisites: Economics 171-172 and permission of the Department. 6 units. PROFESSOR BLACK

301. ECONOMIC ANALYSIS.—Review of contemporary theory relating to consumer behavior, production, the firm, price formation, income distribution, and equilibrium. 3 units. ASSISTANT PROFESSOR DE ALESSI

304, 305. SEMINAR IN MONEY AND BANKING.—3 units each. ASSOCIATE PROFESSOR YOHE

307. QUANTITATIVE ANALYSIS, I.—A systematic analysis of the principal quantitative methods used in microeconomic theory. Neo-classical theories of production and distribution are used as vehicles for presenting the material. Considerable emphasis is placed on the application of mathematical analysis to economic models. 3 units. PROFESSOR FERGUSON

308. QUANTITATIVE ANALYSIS, II.—Linear economic models, particularly

Leontief models, are used in the exposition. Primary emphasis is placed on the application of mathematics to economic theory. Prerequisite: Economics 307 or consent of instructor. 3 units. PROFESSOR FERGUSON

311-312. HISTORY OF POLITICAL ECONOMY.—A detailed review of the development of economic theory, the tools of economic analysis, and economics as a science, together with an analysis of the circumstances affecting this development. Period covered: pre-Christian times through 1936. 6 units. PROFESSOR SPENGLER

313-314. SEMINAR IN ECONOMIC THEORY.—The course consists of directed research in economic theory. The primary purpose is the correction of authoritative eclecticism and its replacement by individually integrated theory. Prerequisite: Economics 301 or its equivalent. 6 units. PROFESSORS HOOVER AND FERGUSON

315. SEMINAR IN ECONOMIC SYSTEMS.—3 units. PROFESSOR HOOVER

316. SEMINAR IN ECONOMIC FUNCTIONS OF THE STATE.—3 units. PROFESSOR HOOVER

317. SEMINAR IN DEMOGRAPHIC, POPULATION, AND RESOURCE PROBLEMS.—3 units. PROFESSOR SPENGLER

319. SEMINAR IN THE THEORY AND THE PROBLEMS OF ECONOMIC GROWTH AND CHANGE.—3 units. PROFESSOR SPENGLER

320. SEMINAR IN TRADE CYCLE, EMPLOYMENT, AND INCOME THEORY.—3 units. ASSOCIATE PROFESSOR YOHE

329. FEDERAL FINANCE.—A study of the expenditures, revenues, and financial administration of the government of the United States, with emphasis on current problems. Special attention given to budgetary procedure, corporate and individual income taxes, and the financial relations between federal and state governments. 3 units. ASSOCIATE PROFESSOR DAVIES

330. SEMINAR IN PUBLIC FINANCE.—3 units. ASSOCIATE PROFESSOR DAVIES

331. SEMINAR IN ECONOMIC HISTORY.—3 units. PROFESSOR SMITH

340. NATIONAL INCOME.—A critical survey of the conceptual framework and structure of national income and its components, the reliability of national income estimates, and their use in analyzing questions of economic policy. 3 units. PROFESSOR HANNAH

355. SEMINAR IN LABOR ECONOMICS.—3 units. PROFESSOR DE VYVER

358. SEMINAR IN LABOR MARKET AND RELATED ANALYSIS.—3 units. ASSOCIATE PROFESSOR GOODWIN

365. SEMINAR IN INTERNATIONAL TRADE—3 units.

366. SEMINAR IN PROBLEMS IN INTERNATIONAL TRADE AND FINANCE.—The seminar will discuss selected topics of current interest, such as the European Common Market, international commodity agreements, migration of labor, amending the IMF charter, and the U.S. gold drain. Prerequisite: Economics 365 or equivalent. 3 units. ASSOCIATE PROFESSOR GERHARD

386. SEMINAR IN LATIN-AMERICAN ECONOMIC PROBLEMS.—3 units. PROFESSOR SMITH

388. INDUSTRIAL ORGANIZATION.—The theory, measurement and history of the firm-structure of industry. Emphasis upon the structure of American industry and upon actual production and pricing practices. Criteria for evaluating industrial performance. 3 units. PROFESSOR MCGEE

389. SEMINAR IN INDUSTRIAL AND GOVERNMENTAL PROBLEMS.—3 units. PROFESSOR MCGEE

401. SEMINAR ON THE BRITISH COMMONWEALTH.—3 units. PROFESSORS SPENGLER, COLE, AND HAMILTON

### RELATED COURSES IN OTHER DEPARTMENTS

Courses comprising a candidate's minor may be selected from fields of forestry, history, mathematics, philosophy, physics, political science, psychology, and sociology and anthropology, or from an area that complements the candidate's area of research interests in economics.

† Graduate students in Economics normally will not receive credit for courses so marked. These courses may be taken for credit by non-Economics graduate students, with the consent of the instructor.

# EDUCATION

PROFESSOR CARTWRIGHT, CHAIRMAN—08D WEST DUKE BUILDING; PROFESSOR BOLMEIER, DIRECTOR OF GRADUATE STUDIES—08D WEST DUKE BUILDING; PROFESSORS HOPKINS, HURLBURT AND STUMPF; ASSOCIATE PROFESSORS COLVER, GITHENS, GEHMAN, PETTY, RUDISILL, SHUMAN, AND WEITZ; ASSISTANT PROFESSORS MARTIN AND SUBLETT

FOR SENIORS AND GRADUATES

Graduate work in Education is offered leading to the A.M., the M.Ed., the M.A.T., and the Ed.D. degrees. For each of these degrees there are specific requirements and prerequisites, all of which may be found stated in detail in this *Bulletin*, pp. 31-39. Department requirements and prerequisites for all of these degrees may be obtained from the Director of Graduate Studies.

From the courses listed below, plus several in related disciplines, a selection may be made which will meet North Carolina requirements for the Advanced Principal's Certificate and the Superintendent's Certificate.

(Some courses below are offered only in the Summer Session; see the Summer Session *Bulletin*.)

**Accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.**

201. TEACHING AND SUPERVISION OF ARITHMETIC.—This course gives special attention to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. The course will consider the meaning theory, method of teaching, problem solving, evaluation, practice and drill, and selection and gradation of arithmetical contents. The course is designed for teachers and supervisors in the elementary school. 3 units.

ASSOCIATE PROFESSOR PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, and analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 3 units. PROFESSORS BOLMEIER, HURLBURT, AND STUMPF

204. THE SCHOOL AS AN INSTITUTION.—Consideration is given to the place of the school in the American social order, and its adaptation to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunity. 3 units. PROFESSOR BOLMEIER

205. CURRICULUM PROBLEMS IN SECONDARY EDUCATION.—A consideration of the aims and objectives of secondary-school subjects, emphasizing practical problems of curriculum-making in the high school. 3 units.*

PROFESSOR CARTWRIGHT

210. INTRODUCTION TO EDUCATIONAL RESEARCH.—The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an appreciation of the essential characteristics of good research. 3 units. PROFESSOR STUMPF

211. THE PROBLEM CHILD (also listed as Psychology S211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 3 units.

213. ELEMENTARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the elementary-school staff. The scope of elementary education is considered to encompass nursery school, kindergarten, and the elementary school. Special treatment is given to the problems of internal organization and management of the elementary school, and its integration with the secondary-school level. 3 units.* PROFESSOR STUMPF AND ASSISTANT PROFESSOR SUBLETT

215. SECONDARY EDUCATION: PRINCIPLES.—Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Must be accompanied by Education 216. 3 units.
PROFESSORS CARTWRIGHT, GITHENS, AND HURLBURT; ASSOCIATE PROFESSOR SHUMAN

216. SECONDARY EDUCATION: INTERNSHIP.—Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215; or, with permission of the Department, full-time teaching for a semester, accompanied by Education 315. Students carrying Education 216 for credit toward a master's degree will be required to take six hours of senior or graduate work in addition to the normal degree requirements. 6 units.
PROFESSORS CARTWRIGHT, GITHENS, AND HURLBURT; ASSOCIATE PROFESSOR SHUMAN

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 units.
ASSOCIATE PROFESSORS GEHMAN AND WEITZ

222. THE CURRICULUM AND MATERIALS OF THE ELEMENTARY GRADES.—A study of curriculum problems in the elementary schools. 3 units.*
PROFESSOR HURLBURT AND ASSISTANT PROFESSOR SUBLETT

224. TEACHING THE SOCIAL STUDIES IN ELEMENTARY SCHOOLS.—This course will treat objectives, curriculum trends, methods, and materials in elementary-school social studies. Topics to receive emphasis include unit-planning, use of the textbook, the reading program, using community resources, audio-visual materials, dealing with controversial issues, teaching time and place concepts, and evaluation. Opportunity will be provided for teachers to work on their own school problems in the social studies. 3 units. PROFESSOR CARTWRIGHT

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 3 units. PROFESSOR CARTWRIGHT

226. TEACHING READING IN THE ELEMENTARY SCHOOL.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. 3 units. ASSOCIATE PROFESSOR RUDISILL

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 units.
PROFESSOR CARTWRIGHT

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 units.* PROFESSOR HURLBURT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 units. PROFESSOR BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems guiding the reading of students. 3 units.
PROFESSOR CARTWRIGHT AND ASSISTANT PROFESSOR SUBLETT

236. TEACHING READING IN THE SECONDARY SCHOOL.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. The course provides practice with secondary-school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during a six-week period. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 units.
ASSOCIATE PROFESSOR RUDISILL

237. LITERATURE FOR ADOLESCENTS.—This course offers a critical survey

of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 units. ASSOCIATE PROFESSOR SHUMAN

238. REMEDIAL READING—PRINCIPLES AND PRACTICE.—A study of the basic causes of reading disability and of principles, methods, and materials for the diagnosis and correction of specific difficulties. The course provides practice with grade school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during the six-week period. A basic course in the psychology of teaching of reading is prerequisite, or Education 226 may be taken concurrently. 3 units. ASSOCIATE PROFESSOR RUDISILL

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar, and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 units.
PROFESSOR BOWMAN AND ASSOCIATE PROFESSOR SHUMAN

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 units.* ASSOCIATE PROFESSOR COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 units. ASSOCIATE PROFESSOR COLVER

242. MEASUREMENT OF APTITUDES, INTEREST, AND ACHIEVEMENT.—A study of the theories and principles of psychological measurement as applied to aptitude, interest, and achievement testing (also listed as Psychology 242). Prerequisite: 12 hours of psychology or educational psychology (6 hours of which may be taken concurrently). 3 units.

243. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 units.
ASSOCIATE PROFESSOR GEHMAN

244. COUNSELING TECHNIQUES.—A study of individual counseling techniques including diagnosis, interviewing, program planning, and counseling evaluation. Prerequisites: Education 242 and 243 or equivalent, which may be taken concurrently. 3 units. ASSOCIATE PROFESSOR GEHMAN

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 units. ASSOCIATE PROFESSOR REYNOLDS

248. PRACTICUM IN COUNSELING.—Practice in individual counseling, including test administration, intake interviewing, diagnosis, counseling, program planning, report preparation, and evaluation. The student will be expected to devote about 150 hours to case work and conferences with his supervisor. Prerequisite: Education 244. 3 units. ASSOCIATE PROFESSOR WEITZ

253. SCHOOL LAW.—The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 units. PROFESSOR BOLMEIER

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education, with opportunity for individual

research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 3 units. ASSOCIATE PROFESSORS COLVER AND WEITZ

256. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 units.* PROFESSOR GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 units. PROFESSOR GITHENS

285. AUDIO-VISUAL AIDS IN EDUCATION.—The aims and psychological bases of audio-visual materials in the classroom. Attention to such materials as charts, filmstrips, flat pictures, maps, models, motion pictures, radio, records, slides, and television. 3 units.*

290. ADMINISTRATION OF SCHOOL PROPERTY.—Planning and management of the school plant and its equipment to meet instructional, health, and community needs for immediate and long-range purposes. This course is intended for teachers, principals, and superintendents. Areas to be treated will include site selection; trends in design, lighting, ventilation, and heating; custodial service and maintenance; and financing. 3 units.* PROFESSOR STUMPF

291. PUBLIC AND COMMUNITY RELATIONS OF SCHOOLS.—A study of the relationships between the entire school or school system and the several publics, especially to the community of a given school. Media for interpreting needs and views of the school to the public and vice-versa will be explored. The study applies to both public and private schools. 3 units. PROFESSOR STUMPF

FOR GRADUATES

315. SEMINAR IN SECONDARY-SCHOOL TEACHING.—Advanced-level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216. 3 units. PROFESSOR HURLBURT

323. PUBLIC SCHOOL FINANCE.—A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 3 units.* PROFESSOR STUMPF

333. SEMINAR IN HIGHER EDUCATION.—An examination of current problems in American higher education, with special emphasis on case studies in organization, administration, and evaluation. For graduate students interested in the administration of higher education or college teaching with consent of the instructor. 3 units. PROFESSOR HOPKINS AND ASSISTANT PROFESSOR MARTIN

335-336. SEMINAR IN SCHOOL ADMINISTRATION.—Organization and control over public education. During the first semester special attention is given to "external control" such as is exercised by various branches and levels of government and by professional and lay groups. "Internal control" as this relates to the principal, the teaching staff, and methods of classroom control, is considered in the second semester. 6 units each semester.

PROFESSORS BOLMEIER, HURLBURT, AND STUMPF; ASSOCIATE PROFESSOR PETTY

350, 351. DIRECTED ACTIVITIES IN SCHOOL ADMINISTRATION.—This course will satisfy, in part, requirements for the Superintendent's or Advanced Principal's Certificate. It involves work on an administrative project approved and supervised by the instructor. Open only to school administrators. 3 or 6 units.

PROFESSORS BOLMEIER, HURLBURT, AND STUMPF; ASSOCIATE PROFESSOR PETTY

354. SEMINAR IN SCHOOL LAW.—Open to students who have completed Education 253 or its equivalent and are working or plan to work on doctoral dissertations or masters' theses of a legal nature. Reports on research projects and recent court cases. 3 units.* PROFESSOR BOLMEIER

# ENGINEERING

## CIVIL ENGINEERING

PROFESSOR BROWN, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—121 ENGINEERING; PROFESSORS MERIAM AND WILLIAMS; ASSOCIATE PROFESSOR BRYAN; VISITING ASSOCIATE PROFESSOR KUMAR; ASSISTANT PROFESSORS HILL AND WOOD

The Department of Civil Engineering offers graduate work leading to the Master of Science degree. A broad approach is emphasized and fundamental principles are stressed. Narrowly specialized courses are not offered. Each graduate student, therefore, engages in a program that is designed to give him technical competence in the sciences related to his field of study, and to give him an understanding of the art of engineering, which depends on imagination and judgment. A student may specialize in one of the following fields of study: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soils engineering or structural engineering.

For requirements of the M.S. degree, see page 31.

A student majoring in sanitary engineering may include in his related work 3 units in the Department of Sanitary Engineering at the University of North Carolina. The minor work will normally be taken in the Departments of Mathematics, and either Chemistry or Physics. A student whose major interest relates to the biological or social sciences may take minor work in these areas. Each graduate student participates in departmental seminars appropriate to his field of study. There is no language requirement for the M.S. degree.

A Bachelor's degree from an accredited engineering college, and study including mathematics through linear differential equations, mechanics of materials, solid and fluid mechanics, are prerequisite for admission to the graduate program.

CE 202. EXPERIMENTAL STRESS ANALYSIS.—The analysis of stress and strain in deformable bodies, correlation of theory with data from experiment; photoelasticity; strain gauges; similitude. 3 units.
PROFESSOR MERIAM AND VISITING ASSOCIATE PROFESSOR KUMAR

CE 203. ADVANCED MECHANICS OF MATERIALS.—Analysis of structural elements described by ordinary differential equations such as beams on an elastic foundation, circular plates; applications to elementary problems of plates and shells. Introduction to elasticity and plasticity. Energy methods in elasticity. 3 units. ASSOCIATE PROFESSOR GARDNER AND ASSISTANT PROFESSOR HILL

CE 204. THEORY OF PLATES AND SHELLS.—Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 203 or equivalent. 3 units. ASSISTANT PROFESSOR HILL

CE 205. THEORY OF ELASTICITY.—Linear theory of elasticity; solutions of two dimensional problems; three dimensional problems of torsion and bending; elastic wave propagation; energy principles. Prerequisite: CE 203 or equivalent. 3 units. PROFESSOR MERIAM AND ASSISTANT PROFESSOR HILL

CE 211. BEHAVIOR OF MATERIALS.—Macroscopic mechanical properties of materials for static, fatigue, dynamic, and creep conditions; lower and high temperature properties; applications. 3 units. VISITING ASSOCIATE PROFESSOR KUMAR

CE 231. STRUCTURAL THEORY AND ANALYSIS.—The application of the fundamental theories of structural action to the design and analysis of structural members. The Gauss Scheme. Specifications. Planning of CE projects. 3 units.
PROFESSOR BROWN

CE 232. REINFORCED CONCRETE THEORY.—Design and analysis of reinforced concrete members including plates and shells. Prestressed and poststressed concrete members. 3 units.* PROFESSOR BROWN

CE 235. FOUNDATION ENGINEERING.—The theory and application of soil mechanics to the design and analysis of foundations, subsurface structures, and earth works. 3 units. STAFF

CE 242. HYDRAULIC ENGINEERING.—Fundamental principles of flow, effects

of gravity, viscosity, compressibility, and surface tension of fluid motion in closed conduits and open channels; surface and form resistance; hydraulic similitude. Fundamentals of applied hydrology. 3 units.* ASSISTANT PROFESSOR WOOD

CE 244. SANITARY ENGINEERING PROCESSES.—Fundamental bases for design of water and waste treatment systems, including: transport, mixing, sedimentation and filtration; gas transfer, coagulation, and bio-treatment processes. 3 units. ASSOCIATE PROFESSOR BRYAN

CE 250. ENGINEERING ANALYSIS.—General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical techniques; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and non-uniform properties and with rigid and non-rigid supports. 3 units. ASSISTANT PROFESSOR WOOD

CE 265. ADVANCED TOPICS IN CIVIL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the Civil Engineering Department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

CE 297, 298. THESIS RESEARCH.—A student with the proper background may carry on research under the direction of the staff in one of the following fields: engineering mechanics; foundation engineering; hydraulic engineering; structural engineering; or sanitary engineering. Thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF

## ELECTRICAL ENGINEERING

PROFESSOR VAIL, CHAIRMAN—131 ENGINEERING; ASSOCIATE PROFESSOR OWEN, DIRECTOR OF GRADUATE STUDIES—108A ENGINEERING; PROFESSORS MEIER AND WILSON; ASSOCIATE PROFESSORS ARTLEY AND KOEPSEL; ADJUNCT ASSOCIATE PROFESSOR BURGER; ASSISTANT PROFESSOR PILKINGTON

The Department of Electrical Engineering offers graduate work leading to the M.S. and Ph.D. degrees. The program is designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, and an understanding of the art of engineering, which depends on human imagination and judgment. Students may specialize in any of the following fields: solid-state materials and devices, ferromagnetics, superconducting circuits, instrumentation, electronics, microwaves, computers and automatic control, and information processing. Major credit in electrical engineering may be given for graduate level physics courses in the area of microwaves.

For requirements of the M.S. degree, see page 31.

The minimum requirements for the Ph.D. degree include: 48 units of course credits (normally 24 in electrical engineering and 24 in mathematics and physics or chemistry), a reading knowledge of two foreign languages (normally French and German), and an acceptable research-based dissertation.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.

EE 201. ENERGY SYSTEMS.—Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units.
ASSOCIATE PROFESSOR ARTLEY

EE 203, 204. INFORMATION SYSTEMS.—General concepts of information storage, transfer, and processing: information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units.
ASSOCIATE PROFESSOR OWEN

EE 207. NETWORK SYNTHESIS.—Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units.

PROFESSOR VAIL AND ASSOCIATE PROFESSORS KOEPSEL AND OWEN

EE 211. SOLID STATE THEORY.—The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units.

PROFESSOR VAIL, ASSOCIATE PROFESSORS ARTLEY AND BURGER, ASSISTANT PROFESSOR PILKINGTON

EE 212. SOLID STATE MATERIALS.—Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units.

PROFESSOR VAIL, ASSOCIATE PROFESSORS ARTLEY AND BURGER, ASSISTANT PROFESSOR PILKINGTON

EE 213. MAGNETICS.—A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units.* PROFESSOR WILSON AND ASSOCIATE PROFESSOR ARTLEY

EE 215, 216. SOLID-STATE DEVICES.—Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: permission of instructor. 6 units.* ASSOCIATE PROFESSOR BURGER AND ASSISTANT PROFESSOR PILKINGTON

EE 221. NONLINEAR ELECTROMAGNETICS.—Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON

EE 222. NONLINEAR ANALYSIS.—Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON

EE 231. NUCLEAR ENGINEERING.—Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units.* PROFESSOR MEIER

EE 241. FEEDBACK CONTROL SYSTEMS.—Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral error criteria; nonstationary and nonlinear systems. Prerequisite: permission of instructor. 3 units.

PROFESSOR WILSON AND ASSOCIATE PROFESSOR KOEPSEL

EE 242. OPTIMUM CONTROL SYSTEMS.—Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; computer applications in control. Prerequisite: permission of instructor. 3 units. ASSOCIATE PROFESSOR KOEPSEL

EE 243. NONLINEAR CONTROL SYSTEMS.—Analysis and design of nonlinear feedback control systems; approximations for small and large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON AND ASSOCIATE PROFESSOR KOEPSEL

EE 259. ADVANCED ELECTRIC ENERGY CONVERSION.—Equations of motion of electromechanical systems; fields and lumped parameters; state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructors. 3 units.*
PROFESSORS MEIER AND WILSON

EE 265. ADVANCED TOPICS IN ELECTRICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units.* MEMBERS OF THE GRADUATE STAFF

EE 297, 298. THESIS RESEARCH.—A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF

EE 399. SPECIAL READINGS IN ELECTRICAL ENGINEERING.—Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 2 or 3 units.*
MEMBERS OF THE GRADUATE STAFF

## MECHANICAL ENGINEERING

PROFESSOR MACDUFF, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—142A ENGINEERING; PROFESSORS KENYON AND MERIAM; ASSOCIATE PROFESSORS ELSEVIER AND BOYLE; ASSISTANT PROFESSOR HARMAN

The Mechanical Engineering Department offers graduate work leading to the degree of Master of Science. It is intended that the work for this degree provide a broad basic foundation in the art of applying science to mechanical design and analysis.

For requirements of the M.S. degree, see pag 31.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

ME 201. THEORETICAL AND APPLIED MECHANICS.—Introduction to the theory of elasticity, vibration analysis, and hydrodynamics. 3 units.
PROFESSORS MACDUFF AND MERIAM

ME 202. THEORETICAL THERMODYNAMICS.—Classical and modern concepts of the conversion of heat and work; the combined First and Second Law; thermo-electricity; super-critical pressure systems; reheat and regenerative processes; binary-vapor systems; introduction to unsteady systems. 3 units.
ASSOCIATE PROFESSOR ELSEVIER AND ASSISTANT PROFESSOR HARMAN

ME 221. ANALYSIS OF INCOMPRESSIBLE AND COMPRESSIBLE FLUID FLOW.—Flow of incompressible and compressible fluids; analysis of subsonic, transonic, supersonic, and hypersonic flow of fluids; potential flow, turbulence, experimental methods. 3 units.* ASSISTANT PROFESSOR HARMAN

ME 222. ANALYSIS OF HEAT TRANSFER.—Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units.* PROFESSOR KENYON

ME 231-232. SYSTEMS ENGINEERING.—Methods of obtaining parameters for strength, response, and stability studies of mechanical systems; impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. PROFESSOR MACDUFF

ME 265. ADVANCED TOPICS IN MECHANICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisites: Approval of the Director of Graduate Studies and the instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

ME 280. NUCLEAR REACTOR POWER CYCLES.—Introduction to basic reactor principles and reactor types; consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants; analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques; metallurgical problems peculiar to reactor design. 3 units.*

PROFESSOR KENYON

ME 297, 298. THESIS RESEARCH.—A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 units. MEMBERS OF THE GRADUATE STAFF

## ENGLISH

PROFESSOR TURNER, CHAIRMAN—325 ALLEN BUILDING; PROFESSOR NYGARD, DIRECTOR OF GRADUATE STUDIES—502 LIBRARY; PROFESSORS BEVINGTON, BOYCE, DUFFEY, GHODES, LIEVSAY, LUMIANSKY, SANDERS, STEVENSON, AND WARD; ASSOCIATE PROFESSORS BUDD, FERGUSON, HENINGER, SMITH, AND WILLIAMS

The department offers graduate work leading to the A.M. and Ph.D. degrees. A statement of the requirements for the Ph.D. degree may be obtained from the Director of Graduate Studies.

FOR SENIORS AND GRADUATES

203. CHAUCER.—Reading and interpretation of the minor poems, *Troilus*, and *The Canterbury Tales*. 3 units. PROFESSORS LUMIANSKY AND NYGARD

207. OLD ENGLISH GRAMMAR AND READINGS.—3 units.

PROFESSORS LUMIANSKY AND NYGARD

208. HISTORY OF THE ENGLISH LANGUAGE.—A survey of the language from Old to Present English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 3 units.

PROFESSORS LUMIANSKY AND NYGARD

209. PRESENT-DAY ENGLISH.—A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage; and the application of language-study to composition. 3 units.

PROFESSOR NYGARD

213. INTRODUCTION TO FOLKLORE.—A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 units.

215, 216. ELIZABETHAN DRAMA.—6 units. (Not 1964-65) PROFESSOR LIEVSAY

217. MILTON.—Milton's poetry and prose, with emphasis on the major poems. 3 units. PROFESSOR LIEVSAY

218. SPENSER.—A study of his works. 3 units. (Not 1964-65)

ASSOCIATE PROFESSOR HENINGER

219, 220. THE EIGHTEENTH CENTURY.—Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson, Boswell, Collins, Goldsmith, the novelists, and other writers. 6 units.

PROFESSOR BOYCE, ASSOCIATE PROFESSOR FERGUSON

221, 222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Lamb, Hazlitt, and other writers. 6 units. PROFESSORS BEVINGTON, SANDERS, STEVENSON

223, 224. ENGLISH LITERATURE OF THE LATER NINETEENTH CEN-

TURY.—The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 units.

PROFESSORS BEVINGTON, SANDERS, STEVENSON

227. LITERARY CRITICISM.—A study of the Greek and Roman critics, in chronological order but with emphasis on their permanent value rather than on the mere history; also of the Continental and English critics to about 1700. 3 units.

PROFESSOR LIEVSAY

229, 230. AMERICAN LITERATURE, 1800-1865.—The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 units. PROFESSOR TURNER, ASSOCIATE PROFESSOR BUDD

233, 234. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors of the period. The first semester will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists; the second semester, Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 units. PROFESSOR GHODES

235, 236. AMERICAN LITERATURE SINCE 1920.—First semester, selected fiction from Sherwood Anderson to the present and the Imagist movement in poetry. Second semester, later poetry and consideration of recent drama. 6 units.

PROFESSOR DUFFEY

237. ENGLISH DRAMA, 1642-1800.—The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 units. (Not 1964-65) PROFESSOR WARD

239. SHAKESPEARE.—The plays and poems. 3 units.

ASSOCIATE PROFESSOR WILLIAMS

244. LITERARY BIOGRAPHY.—Reading and discussion of works by Plutarch, Roper, Walton, Aubrey, Mason, Johnson, Boswell, Lockhart, Carlyle, Froude, Gosse, and Strachey: the development of the literary form, its various methods, various theories of its nature and purpose. 3 units. PROFESSOR SANDERS

251, 252. ENGLISH LITERATURE OF THE SEVENTEENTH CENTURY.—Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 units.

PROFESSOR WARD

261, 262. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 units.

ASSOCIATE PROFESSOR SMITH

264. MAJOR DEVELOPMENTS IN CONTEMPORARY AMERICAN POETRY.—The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Crane, the "Fugitives," and a selection from the poets of the present generation. 3 units. (Not 1964-65)

266. RECENT CRITICAL THOUGHT.—Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 units.

PROFESSOR DUFFEY

269, 270. SOUTHERN LITERATURE.—The principal authors and the chief literary development from the beginning to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 units. PROFESSOR TURNER

274. AMERICAN HUMOR.—The development of the native tradition in the Down-East humorists and the humorists of the Old Southwest. Extensive reading in Mark Twain and his contemporaries, and some attention to the continuation of the tradition after Mark Twain. 3 units. (Not 1964-65) PROFESSOR TURNER

277. ENGLISH PROSE OF THE SIXTEENTH CENTURY.—Readings in the major forms and authors. 3 units.

278. ENGLISH NON-DRAMATIC POETRY OF THE SIXTEENTH CENTURY.—Extensive select readings from representative types and authors, excluding Spenser. 3 units.

FOR GRADUATES

304. STUDIES IN THE METAPHYSICAL POETS.—A careful study of Donne, Herbert, and Vaughan against the seventeenth-century background, with some attention to their influence on other writers in the period and their impact on twentieth-century poetry. 3 units. (Not 1964-65) PROFESSOR LIEVSAY

306. STUDIES IN CHAUCER.—Cultural background, sources, themes, structures; special attention to *Troilus* and the dream-vision poems. 3 units.

311. BEOWULF.—Reading and interpretation of the text. 3 units.
PROFESSORS LUMIANSKY AND NYGARD

313. THE TRADITIONAL BALLAD AND FOLKSONG.—A survey of English, Scottish, and American popular poetry, with attention to the textual and musical traditions. (No technical knowledge of music is required.) 3 units. (Not 1964-65)
PROFESSOR NYGARD

315. MIDDLE ENGLISH LITERATURE.—The literature of England from 1100 to 1500 (excluding Chaucer); a study of medieval genres with a close reading of selected major works. 3 units. PROFESSORS LUMIANSKY AND NYGARD

320. MEDIEVAL ROMANCES.—Origins, types, forms, themes; special attention to Arthurian materials. 3 units.

322. GENRE STUDIES IN TWENTIETH-CENTURY AMERICAN LITERATURE.—Formal and thematic problems posed by the fiction, poetry or drama of this century. 3 units. PROFESSORS DUFFEY AND GOHDES

330. TEXTUAL CRITICISM.—The principles of analytical bibliography and their application to problems and procedures in the study of Elizabethan printed books. 3 units. ASSOCIATE PROFESSOR WILLIAMS

331. EMERSON.—A study of Emerson's ideas as reflected in selected examples of his essays and poems. 3 units. (Not 1964-65) PROFESSOR GOHDES

332. WHITMAN.—A detailed study of *Leaves of Grass* and of selected prose works. 3 units. (Not 1964-65) PROFESSOR GOHDES

333. HAWTHORNE AND MELVILLE.—Extensive reading in the works of Hawthorne and Melville, and close study of selected writings. 3 units. (Not 1964-65)
PROFESSOR TURNER

334. STUDIES IN THE CRITICAL AND PHILOSOPHICAL IDEAS OF COLERIDGE AND CARLYLE.—3 units. PROFESSOR SANDERS

339. STUDIES IN SHAKESPEARE.—Intensive study of carefully limited topics, together with critical analysis and interpretation of selected texts. 3 units. (Not 1964-65)

340. STUDIES IN RENAISSANCE ENGLISH PROSE.—Close readings in various forms and authors as they reflect the culture and thought of the Renaissance. 3 units.

345. THE EIGHTEENTH-CENTURY NOVEL.—Richardson, Fielding, Smollett, and Sterne are emphasized. Attention is given to earlier prose fiction and to other contributing literary patterns. 3 units. PROFESSOR BOYCE

347. STUDIES IN VICTORIAN POETRY.—Analysis of themes, forms, and sources in the works of Tennyson, Browning, Arnold, Rossetti, Swinburne, Meredith, Hardy, and Hopkins. 3 units. (1964-65) PROFESSOR STEVENSON

348. STUDIES IN VICTORIAN FICTION.—Techniques and principal types of material in the novels of Dickens, Thackeray, Trollope, Eliot, Meredith, and Hardy. 3 units. (Not 1964-65) PROFESSOR STEVENSON

351, 352. INTRODUCTION TO RESEARCH.—6 units.
MEMBERS OF THE GRADUATE STAFF

363. STUDIES IN BRITISH POETRY OF THE TWENTIETH CENTURY.—Detailed examination of major poetic texts, with background readings in prose. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR SMITH

378. SAMUEL JOHNSON'S LITERARY CRITICISM AND RELATED TOPICS.—3 units. (Not 1964-65) PROFESSOR BOYCE

ENGLISH FOR FOREIGN STUDENTS.—A non-credit semester course in English for foreign students. Restricted to registered undergraduate and graduate foreign students and, to capacity, to employees and wives of foreign students. Without fee for registered students who are permitted an audit without fee; otherwise a $5.00 fee.

## FORESTRY

PROFESSOR HARRAR, CHAIRMAN, 213 BIOLOGICAL SCIENCES BUILDING; PROFESSOR YOHO, DIRECTOR OF GRADUATE STUDIES, 104 BIOLOGICAL SCIENCES BUILDING; PROFESSORS ANDERSON, KRAMER, NAYLOR, AND OSBORNE; ASSOCIATE PROFESSORS JOHNSON AND RALSTON; ASSISTANT PROFESSORS KNOERR, STAMBAUGH, SULLIVAN, AND WOODS

Major and minor work is offered in the scientific aspects of forestry leading to the Master of Arts and Doctor of Philosophy degrees. Work for these degrees may be pursued in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest mensuration and biometry, forest entomology, forest economics, and forest climatology and hydrology. College graduates who have had specialized training in botany or soil science and in allied basic subjects, such as physics, chemistry, geology, and zoology, may pursue graduate study and research only in the specialized fields for which their previous work has qualified them. For information on professional training in forestry, see Bulletin of the School of Forestry. For detailed information concerning admission to the Graduate School and for regulations governing candidacy for the A.M. and Ph.D. degrees and for other regulations, consult the proper pages in this Bulletin.

FOR SENIORS AND GRADUATES

223. FOREST PATHOLOGY.—Infectious and non-infectious diseases of forest trees, and related deterioration of forest products. Field and laboratory study of symptoms, etiology, and control. Prerequisites: Botany 1 and 2, or equivalent. 3 units. ASSISTANT PROFESSOR STAMBAUGH

230. FOREST ENTOMOLOGY.—Morphology, general classification, life histories, and control of insects injurious to forest trees, logs, and lumber. 3 units. PROFESSOR ANDERSON

241. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisites: one year of biology or permission of instructor. 2 units. PROFESSOR HARRAR

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Desirable prerequisites: plant physiology, plant ecology, and Forestry 261, or equivalent. 3 units. (Summer only) ASSISTANT PROFESSOR WOODS

251. SAMPLING METHODS IN FORESTRY.—Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 units.* PROFESSOR OSBORNE

257. DESIGN OF FORESTRY EXPERIMENTS AND ANALYSIS OF DATA.—Role of experimental design in field and laboratory, and statistical analysis of data as aspects of scientific method in forest research. 5 units.* PROFESSOR OSBORNE

261. FOREST SOILS.—Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalents; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 units. ASSOCIATE PROFESSOR RALSTON

270. ECONOMICS OF FORESTRY.—Development of the principles of economics

useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry, basic and peculiar to forestry, with special attention to the time dimensions of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 units. PROFESSOR YOHO

276. FORESTRY POLICY.—Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public and private forestry organizations, and current policy issues in the light of economic and other criteria. 2 units. PROFESSOR YOHO

290. WOOD ANATOMY.—Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Elementary microtechnique. Prerequisites: one year of biology, Forestry 241 or equivalent. 3 units.

PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

FOR GRADUATES

301, 302. ADVANCED STUDIES IN FORESTRY.—To meet individual needs of graduate students in the following branches of forestry: (a) Silvics, (b) Forest Soils, (c) Forest Economics, (f) Properties of Wood, (g) Forest Mensuration and Biometry, (h) Forest Entomology, (k) Forest-tree Physiology, (l) Forest Pathology, (m) Forest Climatology and Hydrology.

ALL MEMBERS OF THE GRADUATE SCHOOL STAFF

321. RESEARCH TECHNIQUES IN FOREST PATHOLOGY.—Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223 or equivalent. 3 units. ASSISTANT PROFESSOR STAMBAUGH

331. TOXICOLOGY OF INSECTICIDES.—Study of the physical, chemical, and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisites: one course in entomology; organic chemistry is recommended. 3 units.

PROFESSOR ANDERSON

332. ECOLOGY OF FOREST INSECTS.—Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 units. PROFESSOR ANDERSON

341. FOREST METEOROLOGY.—The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 units.

ASSISTANT PROFESSOR KNOERR

342. FOREST INFLUENCES.—The influence of forests and other vegetation on local climate, the hydrolic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 units. ASSISTANT PROFESSOR KNOERR

344. MICROMETEOROLOGY.—Physics of the earth's surface environment with emphasis on plant and animal microclimates: budgets of mass, momentum and energy; vertical structure of wind, temperature, water vapor and carbon-dioxide in relation to exchange processes within the biosphere; local circulation and eddy diffusion; principles of micrometeorological measurement. Prerequisite: Forestry 341, calculus desirable. 3 units. ASSISTANT PROFESSOR KNOERR

348. SEMINAR IN SILVICS.—Advanced topics in silvics are discussed and current research papers and reports are reviewed, analyzed, and evaluated. 2 units.

ASSISTANT PROFESSOR WOODS

352. ANALYSIS OF FOREST MEASUREMENTS.—Empirical equations and curve-fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisite: Forestry 251. 3 units.

PROFESSOR OSBORNE

357, 358. RESEARCH IN FORESTRY.—Credits to be arranged. Students who have had adequate training may do research under direction of members of the Faculty in the following branches of forestry:

a. SILVICS.—Prerequisites: Forestry 241, 243, and 244, or equivalents. ASSISTANT PROFESSOR WOODS

b. FOREST SOILS.—Prerequisite: Forestry 261 or equivalent. ASSOCIATE PROFESSOR RALSTON

e. FOREST ECONOMICS.—Prerequisite: Forestry 270 or equivalent. PROFESSOR YOHO

f. PROPERTIES OF WOOD.—Prerequisites: Forestry 259 and 260, or equivalents. PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

g. FOREST MENSURATION AND BIOMETRY.—Prerequisites: Forestry 151, 251, and 252, or equivalents. PROFESSOR OSBORNE

h. FOREST ENTOMOLOGY.—Prerequisite: Forestry 230 or equivalent. PROFESSOR ANDERSON

k. PHYSIOLOGY OF FOREST TREES.—Prerequisites: Plant physiology and plant ecology or silvics. PROFESSOR KRAMER

l. FOREST PATHOLOGY.—Prerequisites: Plant physiology and Forestry 223 or equivalent. ASSISTANR PROFESSOR STAMBAUGH

m. FOREST CLIMATOLOGY AND HYDROLOGY.—Prerequisite: Forestry 341, 342, or equivalents. ASSISTANT PROFESSOR KNOERR

353. SAMPLING AND EXPERIMENTAL DESIGN IN FORESTRY.—Theory and application of selected sampling designs to forestry populations. Includes multistage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Mathematics 234 (Sample Designs) and 244 (Design of Experiments). 3 units. PROFESSOR OSBORNE

362. FOREST SOIL PHYSICS.—Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR RALSTON

366. FOREST SOIL FERTILITY.—The relationships of soil fertility factors in the growth of forest trees. Emphasis is placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisites: Forestry 262 with analytical chemistry recommended. 3 units. (1964-65) ASSOCIATE PROFESSOR RALSTON

378. SEMINAR IN FOREST ECONOMICS.—Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 units. PROFESSOR YOHO

379. ECONOMIC ANALYSIS IN FORESTRY.—Principles of economics of particular value to problems of resource allocation and efficiency in private forest management based on a static and dynamic firm theory approach, linear programming and activity analysis. Development of production principles applicable to forestry problems in use of land, labor, and capital; resource and production combinations; production location and timing; cost structure and asset control; uncertainty and expectations. Prerequisites: Forestry 270 or consent of instructor. 3 units. PROFESSOR YOHO

396. CHEMISTRY OF WOOD.—A study of the chemical constituents of wood including cellulose and its derivatives, lignin and the lignin-cellulose bond, the hemicelluloses, and the extractives; hydrogenation and hydrolysis of wood; cell wall chemistry. Prerequisites: Forestry 290 or equivalent, one course in college physics; organic chemistry desirable. 2 units. ASSISTANT PROFESSOR SULLIVAN

397. TIMBER PHYSICS.—The physical properties of wood in relation to electricity, heat, light, moisture, and sound; the mechanical properties of wood; influence of site, growth, and anatomy upon strength and quality of wood; standard

timber testing procedures. Prerequisites: Forestry 290 or equivalent, one course in college physics, mathematics through calculus desirable. 2 units.

ASSISTANT PROFESSOR SULLIVAN

## GEOLOGY

PROFESSOR BERRY, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES, 019 SCIENCE BUILDING; ASSOCIATE PROFESSORS DU BAR AND HERON

The Department of Geology offers graduate work leading to the A.M. degree. An undergraduate degree in geology is not a prerequisite for graduate studies, but a student must have had or must take the equivalent of Geology 103, 108, 143, 152 and 166. In addition he must have had one year of college chemistry, one year of college physics, and mathematics through calculus.

Graduate courses in the Department of Geology are designed to provide training in the field of environmental sedimentary geology with specialized training in bio-environments, litho-environments, or modern environments.

An acceptable thesis is necessary for the fulfilment of the A.M. requirements.

FOR SENIORS AND GRADUATES

203. ADVANCED STRATIGRAPHY.—A survey of the Phanerozoic deposits of the world with special emphasis on type areas. 3 units.

ASSOCIATE PROFESSOR DU BAR

206. GEOLOGY OF THE OCEANS.—Introduction to marine geology and oceanography. 3 units.

207. SEDIMENTATION.—Sedimentary processes and principles. 3 units.

ASSOCIATE PROFESSOR HERON

222. SEDIMENTARY MINERALS.—Major detrital and authigenic minerals with emphasis on the clay minerals. 3 units. ASSOCIATE PROFESSOR HERON

234. MARINE GEOLOGY.—Ocean-floor topography, sediment transport and deposition. 3 units.

FOR GRADUATES

305. PHYSICAL ENVIRONMENTS SEMINAR.—3 units.

306. BIO-ENVIRONMENTS SEMINAR.—3 units. ASSOCIATE PROFESSOR DU BAR

371, 372. ADVANCED TOPICS IN GEOLOGY.—To meet the individual needs of graduate students for independent study in the various environmental sedimentary fields. 1 to 3 units. ALL MEMBERS OF THE GRADUATE STAFF

RELATED COURSES IN OTHER DEPARTMENTS

Courses comprising a candidate's minor may be selected from the fields of zoology, physics, mathematics, chemistry, or approved courses offered in the Department of Geology at the University of North Carolina at Chapel Hill (see page 22 of this Bulletin).

## GERMANIC LANGUAGES AND LITERATURE

PROFESSOR SALINGER, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—106 OLD LAW; ASSOCIATE PROFESSORS PHELPS, SEYMOUR AND WILLSON; ASSISTANT PROFESSOR DEINERT

The Department of Germanic Languages and Literature offers graduate work leading to the A.M. degree. Students who expect to major in German should have had sufficient undergraduate courses in Germanic languages to enable them to proceed to more advanced work.

Students who wish to take courses in German for a minor should normally have completed a third-year course (in exceptional cases, a second-year) of college German with acceptable grades.

201, 202. GOETHE.—A study of his life and works, in the light of his lasting significance to world literature. 6 units. (1964-65) PROFESSOR SALINGER

203, 204. EIGHTEENTH CENTURY.—Eighteenth-century German literature in its relation to contemporary European philosophy. 6 units.*

ASSOCIATE PROFESSOR PHELPS

205, 206. MIDDLE HIGH GERMAN.—The language and literature of Germany's first classical period. 6 units.* ASSOCIATE PROFESSOR SEYMOUR

207, 208. GERMAN ROMANTICISM.—The course covers the entire field of German Romanticism from 1800 to 1850. 6 units. (Not 1964-65)
ASSOCIATE PROFESSOR WILLSON

209, 210. KLEIST, GRILLPARZER, AND HEBBEL.—The development of the drama in Germany and Austria between Schiller and naturalism. 6 units.*
PROFESSOR SALINGER AND ASSOCIATE PROFESSORS WILLSON

211, 212. HEINRICH HEINE.—A study of the German poet and his immediate successors in the movement known as *Jungdeutschland*. 6 units. (Not 1964-65)
PROFESSOR SALINGER

213. NINETEENTH-CENTURY LITERATURE.—From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm, and Fontane. 3 units. (1964-65) ASSISTANT PROFESSOR DEINERT

214. THE TWENTIETH CENTURY.—From Naturalism to the present, with emphasis on Hauptmann, Hofmannstal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht, and Benn. 3 units. (1964-65) ASSISTANT PROFESSOR DEINERT

215. SEVENTEENTH-CENTURY LITERATURE.—A study of the leading writers of the Baroque, seen against the background of their time. 3 units. (Not 1964-65) ASSISTANT PROFESSOR DEINERT

216. HISTORY OF THE GERMAN LANGUAGE.—The development of the phonology, morphology, and syntax of German from earliest beginnings to the present. 3 units.* ASSOCIATE PROFESSOR SEYMOUR

218. THE TEACHING OF GERMAN.—Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 units.* ASSOCIATE PROFESSOR PHELPS

—.GRADUATE READING COURSE. An intensive course in German to develop rapidly the ability to read German in several fields. Graduate students only. No credit. ASSOCIATE PROFESSOR SEYMOUR

RELATED COURSES IN OTHER DEPARTMENTS

The following courses in other departments are recommended to students who are majoring in Germanics, as particularly valuable in building a proper background for Germanic studies:

(a) Graduate courses in literature or philology, offered by the ancient and modern language departments, to be selected after consultation with the Germanic Department.

(b) Graduate courses in history and philosophy, offered by those departments, to be selected after consultation with the Germanic Department.

## HISTORY

PROFESSOR WATSON, CHAIRMAN—235 ALLEN; PROFESSOR PARKER, DIRECTOR OF GRADUATE STUDIES—232 ALLEN; PROFESSORS ALDEN, COLTON, CRANE, CURTISS, FERGUSON, HAMILTON, HOLLEY, LANNING, MANCHESTER, NELSON, ROGERS, ROPP, AND WOODY; ASSOCIATE PROFESSORS ACOMB, DURDEN, HOLLYDAY, SCOTT, AND YOUNG; ASSISTANT PROFESSORS DAVIS, GILLIN, AND LERNER

A candidate for the degree of Doctor of Philosophy is required to prepare himself for examination in five fields, of which four shall normally be within history and of which one must be in American history or in the history of Western Europe. The choice and delimitation of fields is determined in consultation with his supervisor and the Director of Graduate Studies. The Department offers graduate instruction in Ancient History; Medieval Europe: Modern Europe: American History; England and the Commonwealth; Russia; Latin America; the Far East in the modern period; South Asia in the modern period; military history; and historiography.

Students may receive credit for either semester of a hyphenated course without taking the other semester if they obtain written permission from the instructor and the Director of Graduate Studies.

FOR SENIORS AND GRADUATES

203-204. THE UNITED STATES, 1850-1900.—The rise of sectionalism, secession, wartime problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform. 6 units.
PROFESSOR WOODY

205-206. THE UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units. PROFESSOR WATSON

209-210. CONSTITUTIONAL HISTORY OF THE UNITED STATES, 1760 TO THE PRESENT.—A study of the basic problems in forming the Constitution; of its development through the major crises in the history of the United States; of the effects of changing social, cultural, economic, and political conditions on the Constitution. 6 units. (Not 1964-65)

212. RECENT INTERPRETATIONS OF UNITED STATES HISTORY.—A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. 3 units.
PROFESSOR WATSON

213-214. THE OLD SOUTH.—Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufacturing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 units. (Not 1964-65) PROFESSOR WOODY

215-216. THE DIPLOMATIC HISTORY OF THE UNITED STATES.—A study of the history of American diplomacy, with particular emphasis upon those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 units. ASSISTANT PROFESSOR DAVIS

217, 218. EUROPE SINCE 1870.—International relations since the Franco-German War is the chief subject of study in this course; special emphasis is placed upon the underlying economic and political influences. 6 units.

221-222. THE AGE OF THE RENAISSANCE.—The decline of characteristic features of medieval civilization and the rise of modern European institutions with particular attention to intellectual movements from Dante to Erasmus. 6 units.
PROFESSOR NELSON

223-224. THE OLD REGIME AND THE FRENCH REVOLUTION, 1661-1815. A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 units. ASSOCIATE PROFESSOR ACOMB

225-226. THE AGE OF THE REFORMATION.—A survey of European civilization from 1500 through the Peace of Westphalia. 6 units. (Not 1964-65)
PROFESSOR NELSON

227, 228. EUROPE IN THE NINETEENTH CENTURY.—A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 units. (Not 1964-65) PROFESSOR PARKER

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 3 units. PROFESSOR PARKER

231-232. THE HISPANIC COLONIES AND REPUBLICS IN AMERICA.—6 units. PROFESSOR LANNING

233-234. THE INSTITUTIONAL, CULTURAL, AND SOCIAL HISTORY OF HISPANIC AMERICA.—The first semester deals with the culture, society, and institutions of the Spanish colonies in America, and the second semester with those of the Hispanic American Republics. 6 units. (Not 1964-65). PROFESSOR LANNING

235, 236.—EUROPEAN EXPANSION OVERSEAS.—In the first semester attention is given to the age of discovery, and to the origin and the development of the great European overseas empires with special emphasis on the role of the Portuguese in India and the Americas. The work of the second semester deals with the decline of the mercantile empires, the emergence of independent centers of European culture overseas (Brazil being taken as an example), and the revival of mercantile imperialism in the late nineteenth and twentieth centuries. 6 units.
PROFESSOR MANCHESTER

237-238. EUROPE IN THE MIDDLE AGES, 395-1500.—Attention is given both to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 units. ASSISTANT PROFESSOR YOUNG

241-242. NATIONALISM AND COMMUNISM IN THE FAR EAST.—The growth of nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 units.
ASSISTANT PROFESSOR GILLIN

245-246. WAR IN THE MODERN WORLD.—This course is concerned with the relations between warfare and modern political, economic and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 units.
PROFESSOR ROPP

247. THE HISTORY OF MODERN INDIA, 1757-1857.—Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 units. PROFESSOR CRANE

248. THE HISTORY OF MODERN INDIA AND PAKISTAN, 1857-1947.—Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 units. PROFESSOR CRANE

249-250. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—Evolution of American society and thought to the present; lectures and class discussions seek to illuminate the interplay of ideas and social practice by the examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 units. PROFESSOR HOLLEY

251-252. RECENT EUROPEAN HISTORY.—A history of the political and economic developments in Europe since 1870. 6 units. PROFESSOR COLTON

257. SOCIAL AND CULTURAL HISTORY OF THE HELLENISTIC WORLD FROM ALEXANDER TO AUGUSTUS.—Lectures, readings, and discussions. This course will not be separately credited without the sequel, 258. 3 units.
PROFESSOR ROGERS

258. SOCIAL AND CULTURAL HISTORY OF THE GRAECO-ROMAN WORLD.—The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues 257 and will not be separately credited. 3 units.
PROFESSOR ROGERS

259-260. THE EMERGENCE OF THE NEW SOUTH, 1865 TO THE PRESENT.—Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 units.
ASSOCIATE PROFESSOR DURDEN

261-262. RUSSIA IN THE TWENTIETH CENTURY.—A study of the background of the Revolution of 1917 followed by an analysis of the history and policies of the Soviet state. 6 units. ASSISTANT PROFESSOR LERNER

263-264. AMERICAN COLONIAL HISTORY AND THE REVOLUTION, 1607-1789.—The founding and institutional development of the English colonies: the background, progress, and results of the Revolution. 6 units. PROFESSOR ALDEN

265-266. THE DEVELOPMENT OF ARGENTINA, BRAZIL, AND CHILE.—Political, social, and economic history of the ABC powers since independence. (Not open to students who have had 131-132). 6 units.

267, 268. FROM MEDIEVAL TO EARLY MODERN ENGLAND.—The intellectual, social, and political problems of transition to modern England, with special emphasis on the English Renaissance. 6 units. PROFESSOR FERGUSON

269. BRITISH HISTORY FROM 1714 to 1867.—The interrelationship of the leadership of such men as Walpole, Chatham, Pitt, and Peel with war, revolution, and social institutions; the rise of the cabinet system; the Industrial Revolution; imperial changes; and reform. 3 units. PROFESSOR HAMILTON

270. GREAT BRITAIN AND THE COMMONWEALTH OF NATIONS, 1867 TO THE PRESENT.—A history of Great Britain at the height of her world dominance and beyond, her oceanic empire, and the evolution of that empire into a unique world-wide Commonwealth of Nations. 3 units. PROFESSOR HAMILTON

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as Religion 285.) 3 units. ASSISTANT PROFESSOR SULLIVAN

297. THE BRITISH EMPIRE IN THE NINETEENTH CENTURY (From 1783).—3 units.

298. THE COMMONWEALTH IN THE TWENTIETH CENTURY.—3 units.

FOR GRADUATES

303-304. The UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units. PROFESSOR WATSON

305-306. SEMINAR IN ENGLISH AND COMMONWEALTH HISTORY.—The work consists of practical training in the methods of historical research based on sources for modern British history. 6 units.

PROFESSORS FERGUSON AND HAMILTON

307-308. SEMINAR IN UNITED STATES HISTORY.—6 units.

PROFESSORS HOLLEY AND WATSON, AND ASSOCIATE PROFESSOR DURDEN

309-310. SEMINAR IN AMERICAN COLONIAL AND REVOLUTIONARY HISTORY.—6 units.

PROFESSOR ALDEN

315-316. SEMINAR IN SOUTHERN HISTORY.—Year course. 6 units.

PROFESSOR WOODY

317-318. SEMINAR IN THE HISTORY OF WESTERN EUROPE.—6 units.

PROFESSORS COLTON AND PARKER, AND ASSISTANT PROFESSOR SCOTT

321-322. SEMINAR IN THE HISTORY OF SPAIN, HISPANIC AMERICA, AND INTER-AMERICAN RELATIONS.—6 units. PROFESSOR LANNING

343-344. SEMINAR IN THE HISTORY OF AMERICAN FOREIGN RELATIONS.—6 units.

347-348. SEMINAR IN RECENT INDIA.—6 units. PROFESSOR CRANE

361-362. SEMINAR IN THE HISTORY OF RUSSIA.—6 units.

PROFESSOR CURTISS

401. SEMINAR IN THE BRITISH COMMONWEALTH.—3 units.

PROFESSORS COLE, HAMILTON, AND SPENGLER

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN.—3 units.
PROFESSOR BRAIBANTI, VISITING PROFESSOR ISLAM, ASSOCIATE PROFESSOR SINHA

### HISTORIOGRAPHY AND THE TEACHING OF HISTORY

FOR GRADUATES

312. SEMINAR IN THE TEACHING OF HISTORY IN COLLEGE.—The work in this course is intended to acquaint students with the problems involved in teaching history in college. It includes critical observation of the teaching by members of the History staff in Duke University. Year course. 2 units.
PROFESSOR MANCHESTER

This course is required of all candidates for the degree of Doctor of Philosophy who are in residence as many as two years at Duke University.

320. HISTORIOGRAPHY.—A critical study of the process of finding, appraising, and interpreting the sources of history and of the presentation of the results in narrative. Works of important historians from Herodotus to the present are analyzed. The student undertakes specific exercises in research, criticism, and narration. There is consideration of such general topics as schools, theories, philosophies, and the function of history. Year course. 4 units. PROFESSOR NELSON

This course is required of all candidates for the degree of Doctor of Philosophy who are in residence as many as two years at Duke University.

## HOSPITAL ADMINISTRATION

PROFESSOR BROWN, PROGRAM DIRECTOR—1140 HOSPITAL; PROFESSOR FRENZEL; ASSOCIATE PROFESSOR SWANSON; ASSISTANT PROFESSOR SMITH, COORDINATOR OF GRADUATE STUDIES—1140 HOSPITAL

Graduate study leading toward preparation for a career of administration in hospitals and other health agencies is offered through a 24-month program leading to the M.H.A. Degree. The program in Hospital Administration is composed of 36 graduate units, of which 18 are in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology. Included in the program is a 12-month administrative residency, a period of supervised administrative experience conducted under faculty supervision in hospitals and other health agencies located within commuting distance of the University campus. Admission to this program is limited to 12 students per year; selection is based on suitability for management of health agencies as well as on capability for graduate study. As there are requirements for participation in the program in Hospital Administration in addition to basic admission requirements of the Graduate School, interested individuals should obtain complete information on prerequisites and selection procedures from the Director of Graduate Studies.

201. HISTORY AND DEVELOPMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions, analysis of medical care organizations in the United States, and an introduction to the medical sciences and to medical terminology. 3 units.
ASSISTANT PROFESSOR SMITH

203-204. PRINCIPLES OF ORGANIZATION AND MANAGEMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—A study of the hospital as an institution including its administrative structure, relationship of the medical staff, and the organization and function of each department. Emphasis is placed on the financial, legal, staffing, community relationship, and other managerial considerations of hospital administration. 6 units.
PROFESSORS BROWN AND FRENZEL, ASSOCIATE PROFESSOR SWANSON, ASSISTANT PROFESSOR SMITH

211-212. SEMINARS IN HEALTH ADMINISTRATION.—A series of seminars designed to complement and add depth to the material covered during the first year, to analyze further the operation of hospitals and other health agencies, and to make the experiences of the residency meaningful.

Attention will be given to formalized techniques of problem-solving, decision-making, human relations, communications, and relating day-to-day experiences to the management process.

Special emphasis will be placed on social and economic aspects of health care and on identifying and projecting current trends in the health field. 6 units.

STAFF AND PRECEPTORS

215. ADMINISTRATIVE RESIDENCY (1 calendar year).—Designed to give the student broader and deeper knowledge and understanding of hospitals and other health agencies through practical experience. Varied experience is provided by rotation through a university medical center, a community hospital, a Veterans Administration and special hospitals, a public health department, a prepayment plan, and other governmental and voluntary health agencies. Two months of the residency will be spent in field experience with the Hospital Section of The Duke Endowment. 3 units. STAFF AND PRECEPTORS

## MATHEMATICS

PROFESSOR GERGEN, CHAIRMAN—134 PHYSICS BUILDING; ASSOCIATE PROFESSOR WARNER, DIRECTOR OF GRADUATE STUDIES—223 PHYSICS BUILDING; PROFESSORS CARLITZ, DRESSEL, ELLIOTT, MURRAY, ROBERTS, AND THOMAS; ASSOCIATE PROFESSORS SHOENFIELD, GALLIE, AND REYNOLDS; ASSISTANT PROFESSORS BRYSON, BURDICK, DEAN, HARRIS, HINRICHS, KELINGOS, SCOVILLE, AND STACKELBERG

Graduate work in the Department of Mathematics is offered leading to the A.M. and Ph.D. degrees. The student, in his undergraduate work, must have had courses in differential and integral calculus, and at least 6 semester hours of other courses in mathematics on the junior or senior level.

The A.M. degree with a major in mathematics is awarded primarily on the basis of scholarship. Of the 24 units of course work required for this degree, 18 units must be taken in the Department of Mathematics.

The Ph.D. degree in mathematics is awarded upon the demonstration of ability and training in research. The original dissertation, therefore, is the most important of the formal requirements for the degree.

Since a reading knowledge of French, German, and Russian is highly desirable for the student of mathematics, he should satisfy the language requirements in two of these languages as early as possible.

213-214. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations, matrices. 6 units. (1964-65, Retired Officers Program only) PROFESSOR THOMAS

215-216. INTERMEDIATE ANALYSIS.—Elements of the theory of functions, principally for real variables. Sequences and series, continuity, differentiation, integration. 6 units. (1964-65, Retired Officers Program only) PROFESSOR GERGEN

217-218. ANALYSIS—Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 units. STAFF

221. DIGITAL COMPUTER.—History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; compilers; error analysis. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. 3 units. ASSOCIATE PROFESSOR GALLIE

222. INTRODUCTION TO NUMERICAL ANALYSIS.—Error analysis; real and complex roots of equations; finite difference methods and theory of interpolation; numerical differentiation and integration; numerical integration of ordinary and partial differential equations; simultaneous equations and matrix inversion. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 221. 3 units. ASSOCIATE PROFESSOR GALLIE

225. THEORY OF EQUATIONS.—Permutations, determinants, matrices, linear systems, polynomials and their roots, constructibility, resultants, discriminants, simultaneous equations. 3 units. (Not 1964-65) STAFF

227-228. THEORY OF NUMBERS.—Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums of squares. Prerequisite: calculus. 6 units. (1964-65) PROFESSOR CARLITZ

229-230. ALGEBRAIC NUMBERS.—Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: theory of equations. 6 units. (Not 1964-65) PROFESSOR CARLITZ

233. STATISTICAL METHODS.—Parameter estimation and hypotheses testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 units. ASSISTANT PROFESSOR BRYSON

234. SAMPLE DESIGNS.—Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 units. ASSISTANT PROFESSOR BRYSON

235-236. ABSTRACT ALGEBRA.—Groups, fields, rings, matrices, quadratic and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: calculus. 6 units. STAFF

244. DESIGN OF EXPERIMENTS.—Methods of constructing and analyzing designs for experimental investigations, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 units. ASSISTANT PROFESSOR BURDICK

245-246. COMBINATION ANALYSIS.—Generating functions, permutations, distributions, partitions, compositions, trees, and networks. Prerequisite: calculus. 6 units. (Not 1964-65) PROFESSOR CARLITZ

247-248. ARITHMETIC OF POLYNOMIALS.—Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 236 or consent of the instructor. 6 units. (1964-65) PROFESSOR CARLITZ

253-254. DIFFERENTIAL GEOMETRY.—Curves and surfaces in three-dimensional Euclidean space, applicability, differential parameters, Riemannian geometry of n-space. Prerequisite: calculus. 6 units.* PROFESSOR THOMAS

271-272. INTRODUCTORY TOPOLOGY.—Topological properties of Euclidean spaces, set-theoretic and combinatorial methods. Prerequisite: calculus. 6 units. PROFESSOR ROBERTS

283. PROBABILITY FOR ENGINEERS.—Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: calculus. 3 units. ASSISTANT PROFESSOR BURDICK

285. APPLIED MATHEMATICAL METHODS I.—Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 units. PROFESSOR DRESSEL

286. APPLIED MATHEMATICAL METHODS II.—Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Mathematics 64. 3 units. PROFESSOR DRESSEL

287-288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 63, or consent of the instructor. 6 units. (Not 1964-65) ASSOCIATE PROFESSOR SHOENFIELD

291-292. THEORY OF FUNCTIONS.—Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: calculus. 6 units. STAFF

FOR GRADUATES

325-326. REAL VARIABLE.—Number system, Lebesgue and Stieltjes integrals, topics in Fourier series. Prerequisite: Mathematics 291-292. 6 units. STAFF

327-328. PARTIAL DIFFERENTIAL EQUATIONS.—Boundary and initial value problems, regularity and existence theorems by methods of *a priori* estimates and functional analysis. Representations of solutions, spectral theory, and potential theory. Prerequisite: Mathematics 291-292 or consent of the instructor. 6 units. (Not 1964-65) ASSISTANT PROFESSOR HARRIS

331-332. ADVANCED TOPICS IN COMPLEX VARIABLES.—Entire and meromorphic functions; harmonic functions and potential theory; Riemann surfaces; several complex variables. 6 units. (1964-65) ASSISTANT PROFESSOR HARRIS

333-334. ANALYTIC THEORY OF NUMBERS.—Distribution of primes, primes in an arithmetic progression, Waring and Goldbach problems, applications of elliptic functions. Prerequisite: Mathematics 291-292. 6 units. (Not 1964-65) PROFESSOR CARLITZ

337-338. EXISTENCE THEOREMS.—Systems of partial differential equations, Pfaffian systems, theorems of Cauchy, Riquier, and Cartan, singular integral varieties. Prerequisite: Mathematics 291-292. 6 units.* PROFESSOR THOMAS

343-344. ORDINARY DIFFERENTIAL EQUATIONS.—Solution by separation of variables, exact differentials, integrating factors, solution in series. Cauchy's existence theorem, linear differential systems, singular points, partial differential equations equivalent to ordinary systems. Prerequisite: Mathematics 291-292. 6 units.* PROFESSOR THOMAS

371-372. DIMENSIONAL THEORY.—Abstract spaces, separation theory for Euclidean spaces, dimension theory. Prerequisite: Mathematics 271-272. 6 units.* PROFESSOR ROBERTS

383-384. LIE GROUPS AND ALGEBRAS.—Differential manifolds; Lie groups; one-parameter subgroups; Lie algebras; differential forms; classification and representations of compact Lie groups and semisimple Lie algebras; solvable and nilpotent algebras; Ado's theorem. Prerequisite: Mathematics 236 and either Mathematics 272 or 292. 6 units. (Not 1964-65) ASSOCIATE PROFESSOR SHOENFIELD

395-396. TOPOLOGICAL ALGEBRA.—Normed and locally convex spaces, Banach algebras. Prerequisite: Mathematics 236 and 292, or consent of instructor. 6 units. (1964-65) ASSOCIATE PROFESSOR WARNER

## MICROBIOLOGY AND IMMUNOLOGY

PROFESSOR CONANT, CHAIRMAN—321 BELL BUILDING AND ASSOCIATE PROFESSOR GROSS, DIRECTOR OF GRADUATE STUDIES, 350 BELL BUILDING; PROFESSORS AMOS, BEARD, LARSH, RUNDLES, AND D. T. SMITH; ASSOCIATE PROFESSORS DAY, OVERMAN, WILLETT; ASSISTANT PROFESSORS METZGAR, OSTERHOUT, ZMIJEWSKI; INSTRUCTOR EIRING

(See MEDICAL SCHOOL, p. 116.)

M211. HEMATOLOGY.—Three lectures and three laboratory periods of 3 hours each, weekly, for eleven weeks in the spring quarter. Prerequisites: courses in general zoology, general botany, histology, and comparative anatomy. 4 units. PROFESSOR RUNDLES

M221. BACTERIOLOGY AND IMMUNOLOGY.—This course is devoted primarily to the study of the biological and immunological relationships of microorganisms (bacteria, fungi, Rickettsia, and viruses) in disease. Five lectures, two 1-hour conferences, and three laboratory periods of 3 hours each weekly, in fall quarter. Prerequisites: courses in general zoology, general botany, histology and comparative anatomy, general and organic chemistry. 6 units.

PROFESSORS AMOS, CONANT, D. T. SMITH; ASSOCIATE PROFESSORS DAY, GROSS, OVERMAN, WILLETT; ASSISTANT PROFESSORS METZGAR, OSTERHOUT, ZMIJEWSKI; INSTRUCTOR EIRING

M291. MEDICAL PARASITOLOGY.—One lecture and one three-hour laboratory period per week for eleven weeks during the fall quarter. Prerequisites: courses in Zoology 204, general botany, histology and comparative anatomy. 1 unit.
PROFESSORS CONANT AND LARSH; INSTRUCTOR EIRING

231. FUNDAMENTALS OF IMMUNOLOGY.—A lecture course on general immunology including the following: non-specific factors in immunity, nature of antigens and antibodies, antibody production, complement, serological methods, blood groups, autoimmune diseases, tumor, immunity, transplantation immunity, and hypersensitivity. 2 units. (Alternate years, fall semester)
PROFESSOR AMOS; ASSOCIATE PROFESSOR DAY; ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

301. PRINCIPLES AND TECHNIQUES OF MAMMALIAN CELL CULTURE.—General principles and techniques of mammalian cell and organ culture in relation to problems in cell biology, pathology, and microbiology. 2 units. (Spring semester) INSTRUCTOR EIRING

302. MICROBIAL GENETICS.—A seminar and lecture course in microbial genetics with special emphasis on gene structure and functions. Admission by permission of instructor. 2 units. (Spring, alternate years) ASSOCIATE PROFESSOR GROSS

303. ANIMAL VIRUSES AND ANIMAL VIRUS DISEASES.—A seminar course to explore various aspects of virus morphology, growth characteristics, immunology and the pathogenesis of virus diseases. Admission with the approval of the staff. (Spring) 2 units. ASSOCIATE PROFESSOR OVERMAN AND ASSISTANT PROFESSOR OSTERHOUT

310. MICROBIAL PHYSIOLOGY.—Lecture and seminar course devoted to the physiology and comparative biochemistry of microorganisms. Prerequisites: Introductory Biochemistry 201 or equivalent. 2 units. ASSOCIATE PROFESSOR WILLETT

311. ADVANCED IMMUNOLOGY.—Genetic control of antigen production, development of antigens in embryogenesis, destruction of antigens in tissue, relationship to differentiation, aggregation. Theories of antibody formation. Nature of antibodies; combining site: antibodies of similar specificity but different properties, reactivity of antibody fractions. Mechanisms of tolerance and immunological paralysis, split and partial tolerance, immunological enhancement. Cellular immunity and the reactions of circulating and cytrophilic antibody. Homograft rejections and auto immunity and delayed hypersensitivity. 2 units.
PROFESSOR AMOS; ASSOCIATE PROFESSOR DAY; ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

312. CANCER IMMUNOLOGY.—An intensive and critical analysis of progress in a major branch of immunological research covering cancer antigens, the tumor-homograft reaction, and the immunotherapy of cancer. Prerequisite: consent of the instructor. 2 units. ASSOCIATE PROFESSOR DAY

313. IMMUNOHEMATOLOGY.—A lecture and laboratory demonstration course covering the serological, genetic, and anthropological aspects of human blood groups isoantigens and antibodies. 2 units. ASSISTANT PROFESSOR ZMIJEWSKI

314. IMMUNOCHEMISTRY.—The structure of antibody molecules. The nature of the combining site. The hapten as a molecular probe. Forces involved in antigen—antibody interaction. Specificity, avidity, and cross-reaction of antibodies. Purification of antibodies. Antibodies as analytical reagents. Prerequisites: Fundamentals of Immunology or Biochemistry or Physical Chemistry or consent of instructor. 2 units. ASSOCIATE PROFESSOR DAY

315. METHODS IN IMMUNOLOGY.—This is essentially a laboratory course in which the student will become familiar with the following methods of immunology: agar precipitation, immunoelectrophoresis, direct agglutination, indirect agglutination, immunofluorescence, complement-fixation and passive cutaneous anaphylaxis. 3 units. ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

316. ANTIGENIC FACTORS IN GRAFT REJECTION.—Production of inbred and co-isogenic strains. Mutation and recombination in inbred animals and tumors. Genetic control of histocompatibility iso-antigens in tumors and normal tissues, differential gene action in hybrids and tumors. Antigenic and immunogic factors in homograft rejection, tests for genetic compatibility. Modification of the immune

response by genetic or immunologic procedures—tolerance, enhancement, suppression of antigens. 2 units. PROFESSOR AMOS

323. READINGS IN BACTERIOLOGY AND IMMUNOLOGY.—This course is intended primarily for graduate students majoring in bacteriology, but it is also available as a minor to other graduate students in related fields, to whom it is recommended by respective supervising committees and with the approval of the Department of Microbiology. Prerequisites: Bacteriology and Immunology, M221. 4 units per semester. PROFESSOR D. T. SMITH

324. RESEARCH SEMINAR ON VIRUSES.—Limited to advanced students. 2 units per semester. PROFESSOR BEARD

325. MEDICAL MYCOLOGY.—This course is intended to familiarize the graduate student majoring in mycology with the fungi causing disease in man and animal. The course includes practical laboratory work with materials from patients in Duke Hospital and those sent to the Duke Fungus Registry from outside sources. Prerequisites: A.M. in Botany with major in mycology and M221. Course limited to four students each year. 4 units per semester. PROFESSOR CONANT

326-327. MICROBIOLOGY SEMINAR.—Graduate students and staff meet weekly to discuss and review recent microbiological literature. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units.

328. SEMINAR IN IMMUNOLOGY.—Selected topics on various aspects of immunology will be discussed. Seminars will be by both students and faculty. 1 unit. Spring semester. ASSISTANT PROFESSOR METZGAR

## PHILOSOPHY

PROFESSOR BAYLIS, CHAIRMAN—212D WEST DUKE BUILDING; PROFESSOR WELSH, DIRECTOR OF GRADUATE STUDIES—212A WEST DUKE BUILDING; PROFESSORS PEACH AND NEGLEY; ASSOCIATE PROFESSORS CLARK AND WILSON; ASSISTANT PROFESSORS BINKLEY AND SPECTOR

The Department of Philosophy offers graduate work leading to the A.M. and Ph.D. degrees. Tutorial work complements formal instruction. Students may specialize in any of the following fields: the History of Philosophy; Logic; Philosophy of Science; Epistemology; Metaphysics; Philosophical Analysis; Ethics; Aesthetics; Political Philosophy and Philosophy of Law. Applicants for admission should offer scores of the Graduate Record Examination or the Miller Analogies Test. Scores are required of applicants for an award.

Individual programs of study are developed for each student. The following requirements, however, are fundamental: (1) In February of their first year new graduate students in philosophy who are not then taking the preliminary examinations for the Ph.D. are required to take three qualifying examinations: one in the history of philosophy, ancient and modern; one on a central philosophical topic, treated systematically; and one in logic, both classical and symbolic. The examination in logic will be waived if, during the first semester, a student has passed with a grade of E or G Philosophy 331c, Logic. A student's achievement on these examinations will be regarded as indicative of his ability to undertake advanced graduate work. (2) Preliminary examinations for the Ph.D., which may be taken only after a student has met the language requirements for that degree, should be taken during the first year of study beyond the A.M. degree, but in any case not later than the end of the second year. In these examinations students are expected to combine historical knowledge with critical understanding.

Work in a minor field outside of the Department, but not necessarily confined to any one department, must include six units for the A.M. or the Ph.D. and may include more as a student's program requires or permits.

### FOR SENIORS AND GRADUATES

202. PHILOSOPHY OF ART.—A study of some fundamental issues in aesthetics, with particular reference to the fields of literature, music, and painting. Problems discussed include: the nature and purposes of the arts; meaning in the arts; art and morality; the role of standards in art criticism; aesthetic judgment; interpretation and evaluation. 3 units. PROFESSOR WELSH

203. CONTEMPORARY ETHICAL THEORIES.—Study of the nature and justification of basic ethical concepts and principles in the light of the chief ethical theories of twentieth-century British and American philosophers.
PROFESSOR BAYLIS AND ASSISTANT PROFESSOR BINKLEY

205. PHILOSOPHY OF HISTORY.—Discussion of the method, metaphysical implications and influence of interpretations of history: Hegel, Marx, Spengler, Toynbee. 3 units. PROFESSOR NEGLEY

208. POLITICAL VALUES.—Analysis of the systematic justification of political principles and the status of political values in the administration of law. 3 units.
PROFESSOR NEGLEY

211. PLATO.—A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 units.
ASSISTANT PROFESSOR BINKLEY

217. ARISTOTLE.—A study of parts of the *Organon, Physics,* and *Metaphysics.* 3 units. (1964-65) ASSOCIATE PROFESSOR WILSON

219. KANT.—Reading and discussion of his philosophy, with some attention to historical continuity. 3 units.* PROFESSOR NEGLEY

225. BRITISH EMPIRICISM.—A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 units. (Not 1964-65) PROFESSOR PEACH

227. CONTINENTAL RATIONALISM.—A critical study of the writings of Descartes, Spinoza, or Leibniz, with special emphasis on problems in the theory of knowledge and metaphysics. 3 units. PROFESSOR PEACH

228. RECENT AND CONTEMPORARY PHILOSOPHY.—A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 units. PROFESSOR WELSH

229. AMERICAN PRAGMATISM.—Studies in the philosophy of Peirce, James, Dewey, and Mead. 3 units.* PROFESSOR WELSH

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: Contemporary Theology 232-233 or consent of instructor. (also listed as Religion 230) 3 units. ASSOCIATE PROFESSOR POTEAT

233. INTRODUCTION TO THE PHILOSOPHY OF SCIENCE.—A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. 3 units.
ASSISTANT PROFESSOR SPECTOR

234. PHILOSOPHY AND THE SCIENCES.—Selected problems in the physical and non-physical sciences. Topics such as space, time, measurement, probability, and induction, and problems in the philosophy of the behavioral and social sciences. Prerequisite, Philosophy 233. 3 units. ASSISTANT PROFESSOR SPECTOR

235. PHILOSOPHY AND THE SCIENCES.—An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincare, and Einstein. (1964-65) 3 units. ASSISTANT PROFESSOR SPECTOR

236. SPECIAL PROBLEMS IN THE PHILOSOPHY OF SCIENCE.—Selected topics concerning the methods of the sciences and the philosophy of science. Prerequisite: previous work in the philosophy of science or the consent of the instructor. (1964-65) 3 units. ASSISTANT PROFESSOR SPECTOR

241. LOGIC.—Fundamental Problems of Logic. 3 units.*
ASSOCIATE PROFESSORS CLARK AND WILSON

246. GENERAL SEMANTICS AND THEORY OF LANGUAGE.—An examination of semantical theory through Frege, Russell, Carnap and Quine, together with a consideration of the implications of meaning theory for general philosophy. 3 units.* ASSOCIATE PROFESSOR WILSON

250. PHILOSOPHICAL ANALYSIS.—A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and

results of this movement. 3 units. PROFESSOR BAYLIS, ASSOCIATE PROFESSOR CLARK, AND ASSISTANT PROFESSOR BINKLEY

252. METAPHYSICS.—A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 units. PROFESSOR BAYLIS

287-288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Godel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 53, or consent of instructor. 6 units. (Also listed as Mathematics 287-288.)

ASSOCIATE PROFESSOR SHOENFIELD

291, 292. CRITICAL PHILOSOPHY.—The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem-solving. 3 units each. Enrollment only by permission of the Department. 291 is ordinarily prerequisite for 292.

ALL MEMBERS OF THE GRADUATE STAFF

FOR GRADUATES

331, 332. SEMINAR IN SPECIAL FIELDS OF PHILOSOPHY.—3 units.

ALL MEMBERS OF THE GRADUATE STAFF

## PHYSICS

PROFESSOR FAIRBANK, CHAIRMAN—119 PHYSICS BUILDING; PROFESSOR GREULING, DIRECTOR OF GRADUATE STUDIES; PROFESSORS BIEDENHARN, FOWLER, GORDY, LEWIS, NEWSON, NIELSEN, SPONER; ASSOCIATE PROFESSOR MEYER; VISITING ASSOCIATE PROFESSOR ROBL; ASSISTANT PROFESSORS BILPUCH, EVANS, MIYAGAWA, ROBERSON, ONLEY, SAYLOR, TANGHERLINI, TILLEY, AND WALTER; INSTRUCTORS HARRIS AND WINNEWISSER

The Department of Physics offers graduate work leading to the A.M. and Ph.D. degrees. Course work is designed to give a broad basic foundation in classical and modern physics. All graduate students will be expected to acquire a thorough knowledge of the various branches of classical physics and some familiarity with modern physics and with basic laboratory skills. They will be required to take such course work in the 200-number courses as may be necessary to obtain this foundation.

The student will be required to take such course work as will best be adapted to the kind of work he will subsequently specialize in and to the kind of research he will undertake. The choice of minor will be similarly determined.

Since a practical reading knowledge of French and German is highly desirable for the student of physics, he should satisfy these language requirements as early as possible.

FOR SENIORS AND GRADUATES

201-202. MECHANICS.—The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and right bodies; the methods of Lagrange and Hamilton; generalized mechanics. Prerequisite: Physics 125. 6 units.

ASSISTANT PROFESSOR TANGHERLINI

213-214. CONTEMPORARY PHYSICS.—A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 units. ASSISTANT PROFESSOR WALTER

217-218. ADVANCED PHYSICS LABORATORY.—Measurements involving the fields of mechanics, electricity, magnetism, heat, sound, optics and modern physics. 2-6 units. ASSOCIATE PROFESSOR MEYER

219. ELECTRICITY AND MAGNETISM.—Fundamentals of electricity and magnetism, physical optics, electromagnetic waves. 3 units.

ASSOCIATE PROFESSOR GREULING

220. ADVANCED ELECTRONICS.—Vacuum tubes and solid state devices, advanced circuit analysis. 3 or 4 units. INSTRUCTOR WINNEWISSER

221-222. THEORETICAL PHYSICS.—Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 units.
VISITING ASSOCIATE PROFESSOR ROBL

FOR GRADUATES

303, 304. THERMODYNAMICS, STATISTICAL MECHANICS.—Fundamental laws of thermodynamics and statistical mechanics with applications to physics and chemistry. Properties of gases and elements of quantum statistics. 6 units.
INSTRUCTOR HARRIS

306. LOW TEMPERATURE PHYSICS.—A study of the properties of matter near the absolute zero of temperature; superconductivity, liquid helium, adiabatic demagnetization. Prerequisite: Physics 303. 3 units. PROFESSOR FAIRBANK

309. SOLID STATE.—A study of matter in the condensed state, including metals, insulators and semiconductors; theory of cooperative effects; thermal and magnetic properties of matter. Prerequisite: Physics 303. 3 units. (Not 1964-65)
ASSOCIATE PROFESSOR MEYER

315-316. PRINCIPLES OF QUANTUM THEORY.—Original and fundamental concepts of quantum theory; wave and matrix mechanics; theory of measurements; exclusion principle and electronic spin. Prerequisite: Physics 201-202. 6 units.
ASSISTANT PROFESSOR ONLEY

318-319. ELECTROMAGNETIC FIELD THEORY.—Electrostatics and potential theory; dielectric and magnetic media; the magnetic field of currents and the law of induction. Maxwell's electrodynamics; theory of wave optics; refraction; interference and diffraction; relativity. Prerequisite: Physics 219. 6 units.
PROFESSOR GREULING

323. THEORY OF ATOMIC SPECTRA.—Excitation of spectra, computation of wave lengths from photographs of spectra, study of the structure of atomic spectra with applications. 3 units. PROFESSOR SPONER

324. THEORY OF MOLECULAR SPECTRA.—A study of the structure of molecular spectra with applications. 3 units. (Not 1964-65) PROFESSOR SPONER

331. MICROWAVE RADIATION.—Microwave generators, cavity resonators, transmission lines, radiation propagation and detection. 3 units. PROFESSOR GORDY

335. MICROWAVE SPECTROSCOPY.—Application of microwaves in the determination of molecular, atomic, and nuclear properties. Stark and Zeeman effects in microwave spectroscopy. Magnetic resonance absorption. 3 units. (Not 1964-65)
PROFESSOR GORDY

341. ADVANCED TOPICS IN QUANTUM THEORY.—Quantum theory of radiation and collisions with special reference to nuclear and high energy physics. Prerequisite: Physics 315-316. 3 units. (Not 1964-65) PROFESSOR BIEDENHARN

343. NUCLEAR PHYSICS.—Elementary theory of the deuteron; low energy neutron proton scattering; theory of nuclear reactions; penetration of potential barriers; nuclear energy levels. Prerequisite: Physics 315. 3 units. PROFESSOR NEWSON

344. ADVANCED NUCLEAR PHYSICS.—The deuteron, nuclear forces, scattering of elementary particles, beta-radiation. Other aspects of nuclear physics susceptible of theoretical interpretation. Prerequisite: Physics 343. 3 units. (Not 1964-65) PROFESSOR BIEDENHARN

345. HIGH ENERGY PHYSICS.—Experimental and theoretical aspects of high energy nuclear processes; properties of mesons and hyperons. 3 units.
PROFESSOR FOWLER

346. TOPICS IN THEORETICAL PHYSICS.—The content of this course will vary from year to year. General methods in quantum mechanics such as: group theory and its applications; elementary particle theory; field theory; theory of

solids; theoretical nuclear physics; atomic and molecular structure. The topic for 1963-64 was elementary particle theory. Prerequisite: Physics 315-316. 3 units.
ASSISTANT PROFESSOR EVANS

351-352. SEMINAR.—A series of weekly discussions on topics related to the research projects under investigation in the department. 2 units.
ALL MEMBERS OF THE GRADUATE STAFF

## PHYSIOLOGY AND PHARMACOLOGY

(See MEDICAL SCHOOL, p. 116.)

PROFESSOR TOSTESON, CHAIRMAN—203 MEDICAL SCHOOL; ASSOCIATE PROFESSOR KOSTYO, DIRECTOR OF GRADUATE STUDIES—251 MEDICAL SCHOOL; PROFESSORS F. BERNHEIM, HALL, AND RENKIN; ASSOCIATE PROFESSORS BLUM, DETURK, HOROWICZ, HULL, LONG, AND MOORE; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSORS MCMANUS, OTTOLENGHI, AND SALZANO

M260. CELLULAR ASPECTS OF DRUG ACTION.—An introduction to cell-drug interaction with emphasis placed on mechanisms of action and structure-activity relationships of chemical agents. Prerequisites: organic chemistry, introductory animal or plant physiology. Undergraduates by permission of instructors. 1 unit. PROFESSOR F. BERNHEIM, ASSOCIATE PROFESSOR DETURK AND ASSISTANT PROFESSOR OTTOLENGHI

M261-262. HUMAN PHYSIOLOGY.—Six lectures and twenty laboratory hours per week. Prerequisites: Anatomy M201 and Biochemistry M241 (or equivalents) and at least one year of college physics. Feb.-June. Credits depending on work taken. (Maximum 8 units.) ALL MEMBERS OF THE GRADUATE STAFF

M271. CONTEMPORARY PHYSIOLOGY.—Contemporary physiology taught from the current literature. Prerequisite: Physiology M261-262 or the equivalent. 4 units. ALL MEMBERS OF THE GRADUATE STAFF

M279. INTRODUCTORY SEMINAR IN PHYSIOLOGY.—Weekly discussions by the staff outlining the scope of modern physiology. Required of all graduate students majoring in physiology. 1 unit. ALL MEMBERS OF THE GRADUATE STAFF

M365. RESPIRATION AND AERO-PHYSIOLOGY.—A study of the fundamental respiratory processes in living organisms, and of the special physiological responses and adjustments of the individual during high-altitude flight. Lectures, conferences, laboratory. Prerequisites: M261-262 or equivalent. 4 units.
PROFESSOR HALL AND ASSISTANT PROFESSOR SALZANO

M369. PHARMACOLOGY. MODE OF ACTION OF DRUGS.—Studies and discussions of the pharmacological action of drugs in terms of biochemical and physiological processes. Lectures, conferences, and laboratory. Prerequisites: M261-262 or equivalent. 4 units. PROFESSORS F. BERNHEIM AND RENKIN, ASSOCIATE PROFESSOR DETURK, ASSISTANT PROFESSOR OTTOLENGHI

M370. SEMINAR.—A weekly meeting in which original researches by members of the staff and guests are reported. Required of all graduate students who are candidates for the M.A. or Ph.D. degree. 2 units.
ALL MEMBERS OF THE GRADUATE STAFF

M371. TOPICS IN PULMONARY AND CARDIOVASCULAR PHYSIOLOGY.—This course is concerned with processes which account for exchange of gases with the atmosphere, aeration of the blood, transport of oxygen and carbon dioxide, and exchange of gases at the tissues. Emphasis is placed on classical experiments describing physical factors in thoracic motion, ventilation-perfusion relations, function of hemoglobin as carrier of oxygen and carbon dioxide, flow-pressure relations in the gas and blood streams, and factors which disturb the exchange of gases in the pulmonary and systemic capillaries. Prerequisites: M261-262 or equivalent. 2 units. ASSOCIATE PROFESSORS HULL AND LONG, ASSISTANT PROFESSOR SALZANO

M372. RESEARCH.—Individual investigations in the various fields of physiology. Credits to be arranged. ALL MEMBERS OF THE GRADUATE STAFF

M373. CELLULAR ENDOCRINOLOGY.—Current concepts of the mechanism of action of hormones are covered with special reference made to the effects of hormones on cell membrane permeability and on the activity of enzyme systems. The relationships of these cellular actions of hormones to the hormonal regulation of growth, metamorphosis, osmoregulation, pigmentation and reproduction are discussed. 2 units. ASSOCIATE PROFESSOR KOSTYO

M375. PHYSIOLOGY OF EXCITABLE CELLS.—This course includes the following topics: Membrane circuit diagrams and cable properties; Energy storage and discharge in nerve, muscle; Membrane non-linear voltage-current relations; Axonal and junctional transmission; Cellular organization and electrical activity in skeletal, cardiac and smooth muscle; Electro-mechanical coupling; Thermodynamics of muscle; Mechanics of muscular contraction; and Molecular basis of contraction. 2 units. ASSOCIATE PROFESSORS HOROWICZ AND MOORE

M377. CELLULAR TRANSPORT PROCESSES.—A sequential study of the following topics: The physical chemistry of transport processes which occur in living cells (e.g. diffusion, flow, electric current); contemporary knowledge of the molecular mechanism of salt and water transport across cell membranes with special reference to the conversion of chemical bond energy to transport work in active transport; the integration of transport processes in individual plasma membranes to accomplish regulation of cytoplasmic salt and water composition and cell volume, as well as the secretion of fluids across epithelial cell layers in organs specialized for this function (intestine, kidney). 2 units.

PROFESSOR TOSTESON, ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN, ASSISTANT PROFESSOR MCMANUS

## POLITICAL SCIENCE

PROFESSOR RANKIN, CHAIRMAN—308 LIBRARY; PROFESSOR WILSON, DIRECTOR OF GRADUATE STUDIES—405 LIBRARY; PROFESSORS BRAIBANTI, COLE, CONNERY, AND HALLOWELL; VISITING PROFESSOR KULSKI; ASSOCIATE PROFESSORS LEACH, PROCTOR, AND SINDLER

The Department of Political Science offers graduate work leading to the A.M. and Ph.D. degrees. Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree.

Instruction is designed to prepare the student for teaching, for government service, and for other work related to public affairs. Before undertaking graduate study in political science, a student is ordinarily expected to have completed at least 12 semester hours of course work in political science, including some work in American government.

Fields of political science in which instruction is at present offered for candidates for the degree of Doctor of Philosophy are the following: American Government and Constitutional Law; Comparative Government (with special reference to European Institutions, Southern Asia, or Commonwealth Institutions); Political Theory; American State and Local Government; International Law and Organization; Public Administration; Political Parties and Voting Behavior. Candidates for the degree of Doctor of Philosophy who propose to major in political science must elect five fields including Comparative Government and Political Theory; at least one of the five fields must be taken in a department other than the Department of Political Science.

### FOR SENIORS AND GRADUATES

207. AMERICAN CONSTITUTIONAL LAW AND THEORY.—A study of leading principles of American government, as developed through judicial interpretation of the Constitution. 3 units. PROFESSOR RANKIN

208. AMERICAN CONSTITUTION LAW AND CURRENT NATIONAL PROBLEMS.—A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 units.

PROFESSOR RANKIN

209. PROBLEMS IN STATE AND LOCAL GOVERNMENT IN THE UNITED STATES.—A study of the historical development of the state and local governments, their present organization and subdivisions and their relation to each other. Special

attention is given to the position of the states in the federal union through the study of federal-state, inter-state, and state-local relation. 3 units.

PROFESSOR RANKIN

221. INTERNATIONAL PUBLIC ORGANIZATION.—A study of the structure and functioning of the United Nations organs, of related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 units. PROFESSOR WILSON

223. POLITICAL THOUGHT TO THE SEVENTEENTH CENTURY.—A survey from the time of Plato to the close of the seventeenth century; Graeco-Roman, Patristic and German thought; individualism and cosmopolitanism; effect of the Church-State controversy and the conciliar movement; medieval constitutionalism; legislative sovereignty. 3 units. PROFESSORS HALLOWELL AND WILSON

224. MODERN POLITICAL THEORY.—An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 units. PROFESSOR HALLOWELL

225. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 units.

PROFESSOR COLE AND ASSOCIATE PROFESSOR PROCTOR

226. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 units.

PROFESSOR COLE AND ASSOCIATE PROFESSOR PROCTOR

227-228. INTERNATIONAL LAW.—Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 units.

PROFESSOR WILSON

229. RECENT AND CONTEMPORARY POLITICAL THEORY.—The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 units. PROFESSOR HALLOWELL

230. AMERICAN POLITICAL INSTITUTIONS.—A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics, this course is concerned with the Constitutional Convention of 1787, and the development of Congress, the Presidency, and the Supreme Court. 3 units. PROFESSOR RANKIN

231. AMERICAN POLITICAL THEORY.—An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 units.*

PROFESSOR HALLOWELL

234. CIVIL-MILITARY RELATIONSHIPS IN AMERICAN GOVERNMENT.—A consideration of the role of the military in American government both in practice and in theory. Special emphasis will be given to formal civil-military structural arrangements for determining policies such as the National Security Council, and to the degree of civilian control within the military establishment. 3 units.*

PROFESSOR CONNERY

235. THE BRITISH COMMONWEALTH.—An analysis of the political relationships between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. A course designed in part to utilize the occasional services of visiting professors from Commonwealth countries. 3 units. PROFESSOR COLE

241. ADMINISTRATIVE MANAGEMENT.—An advanced course in public administration with special attention being given to the development of scientific

management, its application to government in the United States, and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 units. PROFESSOR CONNERY

242. NATIONAL ADMINISTRATION.—A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 units. PROFESSOR CONNERY

244. ADMINISTRATIVE LAW AND PROCESS.—The nature and law of the administrative process in the context of American government and politics, with special attention to the powers, procedures, and judicial control of administrative agencies. 3 units. ASSOCIATE PROFESSOR HALL

246. GOVERNMENT ADMINISTRATION AND PUBLIC POLICY.—Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in the field of public policy, and their possible solution. 3 units. PROFESSOR CONNERY

250. COMPARATIVE GOVERNMENT AND POLITICS—SOUTHERN ASIA I.—Political development of the Indo-Pakistan subcontinent until the partition of 1947 and the development of India after that date. Attention will be given to the structure of Indian society and to political problems under British rule. Principal emphasis will be on the development of India as an independent state and on the relationship of politics to economic development. 3 units. PROFESSOR BRAIBANTI

251. COMPARATIVE GOVERNMENT AND POLITICS—SOUTHERN ASIA II.—A continuation of Political Science 250 with chief emphasis on the political development of Pakistan since 1957. Comparative analysis of India and Pakistan. Some attention will also be given to Ceylon and Malaya, as members of the Commonwealth. 3 units. PROFESSOR BRAIBANTI

252. COMPARATIVE GOVERNMENT AND POLITICS—JAPAN.—A survey of the civilization of Japan, and an analysis of political institutions from the Taikwa Reforms to the modern period. 3 units. PROFESSOR BRAIBANTI

260. SOVIET GOVERNMENT.—An analysis of the Soviet State and party structure and policies, of their relations to other public organizations and of their impact on the situation of the Soviet individual. The analysis will include a study of the Party policies toward the intelligentsia, the workers, and the peasants. 3 units. VISITING PROFESSOR KULSKI

275. THE NATIONAL PARTY SYSTEM.—An intensive examination of selected facets of American national political parties, such as relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 units. ASSOCIATE PROFESSOR SINDLER

276. COMPARATIVE STATE PARTIES AND POLITICS.—A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organization, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 units. ASSOCIATE PROFESSOR SINDLER

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 3 units.* ASSOCIATE PROFESSOR LEACH

292. MUNICIPAL ADMINISTRATION.—A study of principles and methods relating to municipal administration in the United States. 3 units.* PROFESSOR RANKIN AND ASSOCIATE PROFESSOR LEACH

FOR GRADUATES

301-302. DEPARTMENTAL GRADUATE SEMINAR.—An introduction to research methodology, inter-disciplinary relationships, and current research problems. Required of all graduate majors in political science. No credit. ALL MEMBERS OF THE GRADUATE STAFF

310. SEMINAR IN STATE GOVERNMENT.—Open to students who have completed course 209 or its equivalent. 3 units. PROFESSOR RANKIN

321. SEMINAR IN POLITICAL THEORY.—Open to students who have completed 6 units in Political Science 223, 224, 229, 231 or their equivalents. 3 units.
PROFESSOR HALLOWELL

325. SEMINAR IN COMPARATIVE GOVERNMENT.—Open to students who have completed courses 225 or 226 or equivalents. 3 units. PROFESSOR COLE

328. SEMINAR IN INTERNATIONAL LAW.—Open to students who have completed course 227-228 or its equivalent. 3 units. PROFESSOR WILSON

330. SEMINAR IN ASIAN COMPARATIVE GOVERNMENT AND POLITICS.—Emphasis on the comparative political development of India, Pakistan, Japan and other selected Asian nations. Some attention will be given to recent developments in the methodology of analyzing Asian politics. 3 units.
PROFESSOR BRAIBANTI

341. SEMINAR IN PUBLIC ADMINISTRATION.—Directed reading, discussion and reports concerning the theory and practice of public administration. 3 units.
PROFESSOR CONNERY

360 SEMINAR IN RUSSIAN GOVERNMENT.—Open to students who have completed course 226 or 260, or on individual approval by the instructor. 3 units.
VISITING PROFESSOR KULSKI

376. SEMINAR IN POLITICAL BEHAVIOR.—Open to students who have completed courses 275 and 276 or their equivalents, or by special approval of the instructor. 3 units. ASSOCIATE PROFESSOR SINDLER

401. SEMINAR IN THE BRITISH COMMONWEALTH.—3 units.
PROFESSORS COLE, HAMILTON, SPENGLER, AND BRAIBANTI

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN.—3 units.
PROFESSOR BRAIBANTI AND ASSOCIATES

RELATED COURSE WORK IN THE SCHOOL OF LAW

There may be graduate credit for course work completed in the Duke University School of Law, under regulations referred to on page 22 of this *Bulletin*.

## PSYCHOLOGY

PROFESSOR ZENER, CHAIRMAN, 224 PSYCHOLOGY-SOCIOLOGY BUILDING; PROFESSOR GUTTMAN, DIRECTOR OF GRADUATE STUDIES, 103 PSYCHOLOGY-SOCIOLOGY BUILDING; PROFESSORS ADAMS, ALEXANDER, DAI, DIAMOND, JONES, KIMBLE, AND KOCH; ASSOCIATE PROFESSORS BANHAM, BONEAU, BORSTELMANN, BREHM, REICHENBERG-HACKETT, AND WALLACH; ASSOCIATE RESEARCH PROFESSOR GAFFRON; ASSISTANT PROFESSORS ALTROCCHI, CARSON, ERICKSON, GREENWOOD, KREMEN, LAKIN, OBRIST, AND SCHIFFMAN; LECTURERS COHEN, CROVITZ, EISDORFER, GEHMAN, SHMAVONIAN, AND SOMJEN; VISITING ASSOCIATE PROFESSORS SCHÖNBACH (1963-64) AND SPERLING (SPRING, 1964)

The Department offers work leading to the A.M. and Ph.D. degrees. For the Ph.D. degree the areas of concentration are: theoretical experimental psychology, including physiological and comparative psychology; social psychology; and personality clinical psychology. All fields of specialization presuppose thorough preparation in the general methods, data, and theories of psychology. Programs of study are typically arranged to provide this common background in the first year or two, with increasing specialization in course work and research in subsequent years. Early in the second year of residence, the Ph.D. student is expected to have planned his further program of specialized studies; by the end of the second year, when the preliminary examination is normally taken, the doctoral dissertation plan should be formulated. An original dissertation demonstrating independent research competence and scholarship is the most important formal requirement for the Ph.D. degree.

Students specializing in clinical psychology undertake field work in a variety of settings, and an integral part of this program is a one-year internship in an approved and appropriate institution. Clinical internship is arranged for the third year of study or later year, depending on the student's progress and needs.

Minor work in a variety of fields is available, but the areas most relevant to graduate work in psychology are the biological sciences (zoology, neuroanatomy, physiology), mathematics and statistics, sociology and anthropology, and philosophy of science.

Further details concerning the program of studies in psychology may be obtained from the Director of Graduate Studies in Psychology.

201, 202. THE FIELD OF PSYCHOLOGY.—A survey of representative theoretical and empirical problems drawn from all levels of psychological functioning. 3 units each semester. PROFESSOR GUTTMAN AND GRADUATE STAFF

203. PSYCHOLOGY OF PERCEPTION.—An examination of current systematic formulations with emphasis upon the intensive analysis of a variety of representative investigations. 3 units. PROFESSOR ZENER

204. COMPARATIVE PSYCHOLOGY.—The study of behavior as related to species and of speciation as dependent upon behavior; instinct, imprinting and learning at different phylogenetic levels. 3 units. PROFESSOR ADAMS

209. EXPERIMENTAL METHODS IN PSYCHOLOGY.—A study of methods for the identification, control, and recording of essential variables in psychological situations, with emphasis upon the relation of experimental techniques to problem formulation. Laboratory, lectures, and discussions. 3 units. PROFESSOR KIMBLE

210. COGNITION AND HIGHER MENTAL PROCESSES.—An intensive analysis of the literature on thinking, problem-solving, creativity, language and related topics. Emphasis is upon the functional significance of these aspects of intellectual activity and upon the experimental methodology involved in their study. 3 units. ASSOCIATE PROFESSOR BONEAU

213, 214. CONDITIONING AND LEARNING.—A survey of the literature on classical and instrumental conditioning and other forms of sample learning. Emphasis is on classical conditioning in 213 and on instrumental behavior in 215. 6 units. PROFESSORS GUTTMAN AND KIMBLE

215. DEVELOPMENTAL PSYCHOLOGY.—A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. 3 units. ASSOCIATE PROFESSOR BORSTELMANN

216. BIOLOGICAL PSYCHOLOGY.—The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy and genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potentials, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 units. PROFESSOR DIAMOND

217. RESEARCH METHODS IN SOCIAL PSYCHOLOGY.—Presents the theory and practice of data collection methods in social psychology. Emphasis is on the interplay between design and technique. The methods covered include formal scaling procedures, systematic observational techniques and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 units. ASSOCIATE PROFESSOR BREHM

218. SOCIAL PSYCHOLOGY.—An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 units. PROFESSOR JONES

234. SEMINAR IN PERSONALITY.—A detailed consideration of selected research topics of current interest in the experimental study of personality, including risk-taking, creativity, and cognitive styles. Prerequisites: Psychology 245 and 246 or equivalent. 3 units.

236. THEORETICAL PSYCHOLOGY.—This course is devoted to the analysis of techniques of theory construction in psychology. The discussion of these methodological issues is co-ordinated with the analysis of concrete formulations in contemporary psychological theory. 3 units. PROFESSOR KOCH

237. FUNCTIONAL NEUROPHYSIOLOGY.—This course considers the mecha-

nisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural systems, and the integrative and associative functions of the nervous system. Laboratory demonstrations and participation. 3 units. ASSISTANT PROFESSOR ERICKSON

238. THE ELECTROENCEPHALOGRAM AND PSYCHOLOGICAL FUNCTION.—A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, conditioning and learning. Lectures, laboratory demonstrations and clinical case presentations. 3 units. ASSISTANT PROFESSOR OBRIST

245, 246. PERSONALITY THEORY.—An examination of representative models of human functioning from Freud to the present day. Included are examples from psychoanalytical, field theoretical, and behavioristic approaches. 3 units each semester. PROFESSOR ALEXANDER AND ASSISTANT PROFESSOR KREMEN

247, 248. PERSONALITY ASSESSMENT.—Introduction to the assessment of human personality through the study of personal documents, interview data, objective and projective test material. Laboratory sessions will be concerned with personality assessment of normal human subjects over extended time periods. 3 units each semester. PROFESSOR ALEXANDER AND ASSISTANT PROFESSOR KREMEN

253, 254. PERSONALITY DEVELOPMENT.—A survey of behaviors and concepts relating to personality functioning through the life span from infancy to old age. Laboratory sessions will involve the study of individuals in natural and experimental contexts by observation and testing. 3 units each semester.
ASSOCIATE PROFESSOR BORSTELMANN AND STAFF

265. FUNDAMENTAL STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—Introduction to probability and the use of statistics in description and hypothesis testing in psychology including the following applications: correlation techniques, chi-square and t tests, distribution-free tests and one-way analysis of variance. Prerequisite: Psychology 117-118 or equivalent. 3 units.
ASSOCIATE PROFESSOR BONEAU

266. ADVANCED STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—The basic theory and applications of analysis of variance techniques to complex experimental designs will be covered. Additional advanced techniques, including factor analysis, will be introduced. Prerequisite: Psychology 265 or equivalent. 3 units. (First semester.) ASSOCIATE PROFESSOR BONEAU

271. SEMINAR IN SELECTED PROBLEMS.—3 units. (Spring, 1964: Psycholinguistics.) VISITING ASSOCIATE PROFESSOR SCHÖNBACH

273. PRINCIPLES OF PSYCHOLOGICAL MEASUREMENT.—Psychological measurement will be discussed in the context of the theoretical questions which motivate research, and the related demands of scientific inference. Topics will include methods of psychometric scaling and test construction, as well as selected methods for data analysis. Prerequisite: Psychology 265 or equivalent. 3 units.
ASSISTANT PROFESSOR SCHIFFMAN

282. INTRODUCTION TO METHODS IN PSYCHOTHERAPY.—Current trends in psychotherapeutic practice and research are discussed, as a means of introducing the student to the field. Emphasis is upon the application of principles drawn from theories of personality to individual and group psychotherapy. Discussions of selected readings and some field experience in therapy are included. 3 units. ASSISTANT PROFESSOR LAKIN

292. THE HISTORY OF PSYCHOLOGY.—3 units. PROFESSOR ADAMS

293. SENSATION AND PERCEPTION.—The development of exact, comprehensive methods in the study of sensory physiology and psychology. Introduction to linear theory, its application to the description of the stimulus, sensory transducers and neuron networks. Theories of thresholds, detection, sensory and multidimensional scaling. Selected problems in the perception of objects and complex events. Memory. Emphasis will be on the visual modality. 3-5 units. (Spring Semester, 1964.) VISITING ASSOCIATE PROFESSOR SPERLING

FOR GRADUATES

305. PSYCHOPATHOLOGY.—An examination of behavior disorders, with particular emphasis on explanatory concepts and the evidence from research in this field. 3 units. ASSOCIATE PROFESSOR COHEN

306. SEMINAR IN DEVELOPMENTAL PSYCHOLOGY.—2 or 3 units. PROFESSOR ADAMS

309. SEMINAR IN LEARNING.—3 units. PROFESSOR KIMBLE

310. SEMINAR IN PERCEPTION.—3 units. PROFESSOR ZENER

311. SEMINAR IN INSTRUMENTAL BEHAVIOR.—3 units. PROFESSOR GUTTMAN

312. SEMINAR IN THEORETICAL PSYCHOLOGY.—3 units. PROFESSOR KOCH

316. SEMINAR IN SOCIAL PSYCHOLOGY.—3 units. PROFESSOR JONES

318. SEMINAR IN SOCIAL INFLUENCE.—3 units. ASSOCIATE PROFESSOR BREHM

324. SEMINAR: BEHAVIORAL STUDIES OF THE BRAIN—3 units. PROFESSOR DIAMOND

335-336. CLINICAL PSYCHOLOGY PRACTICUM.—Seminar discussion and supervised field experience in the application of basic psychological procedures and principles to clinical cases in a variety of institutional settings. Prerequisite: Psychology 221-222. 3 units each semester. PROFESSOR ALEXANDER AND STAFF

337. SEMINAR IN SENSORY DISCRIMINATION.—A study of the neural bases of discrimination. 3 units. ASSISTANT PROFESSOR ERICKSON

341. PRINCIPLES OF PSYCHOTHERAPY, I.—Contributions from psychoanalysis, psychology and social sciences will be reviewed to form a unified framework for understanding and treatment of behavior disorders. Emphasis on the problems characteristic of man living in society and culture and on principles of psychotherapy required by the human needs for consistency, self-esteem and self-realization. Selected case material will be used. Prerequisite: Psychology 282. 3 units. PROFESSOR DAI

342. PRINCIPLES OF PSYCHOTHERAPY, II.—Application of principles of psychotherapy in a detailed examination of interviews conducted by students. Emphasis on the role of therapist's personality in the therapy process and on problems of technique. Prerequisite: Psychology 341. 3 units. PROFESSOR DAI

343, 344. ADVANCED SEMINAR IN CLINICAL PSYCHOLOGY.—3 units. ALL MEMBERS OF THE CLINICAL STAFF

371. PRE-SCHOOL BEHAVIOR PROBLEMS.—The diagnostic evaluation of behavior development in infants and preschool children. The nature and causation of developmental anomalies. (Physical handicaps and social conditions in relation to intellectual and personality development.) Preventive and remedial measures. 3 units. ASSOCIATE PROFESSOR BANHAM

## RELIGION

PROFESSOR BEACH, DIRECTOR OF GRADUATE STUDIES—307 DIVINITY SCHOOL; PROFESSORS ANDERSON, CLARK, CUSHMAN, PETRY, PRICE, AND STINESPRING; ASSOCIATE PROFESSORS BAKER, HENRY, HERZOG, LACY, POTEAT; ASSISTANT PROFESSORS HILLERBRAND, GRISLIS, OSBORN, ROBINSON, STRUGNELL, AND SULLIVAN; LECTURER WINTERMUTE

The Department of Religion offers graduate work leading to the A.M. and Ph.D. degrees. Students may major in one of three fields: (1) Biblical Studies; (2) Historical Studies; and (3) Systematic and Contemporary Studies. They will be expected to take such courses in one or both of the other fields as will conduce to an adequate understanding of their chosen fields of specialization.

In addition to course work in these major fields, students will take such other courses in cognate fields as will contribute to the enrichment of their major studies.

This minor requirement may be fulfilled either by work in a cognate department, such as Ancient Language and Literature, History, or Political Science, or by work in a cognate field within the Department of Religion other than the field of major concentration.

The program of doctoral studies presumes a grounding in religion such as is normally derived from the course content of theoretical subjects of a seminary curriculum. Candidates for admission to the doctoral program are favored, therefore, who hold a B.D. degree from an accredited seminary or who have had at least two years of seminary study beyond the B.A. degree. Students applying for graduate

work in religion directly from an undergraduate program should have had a strong undergraduate major in religion, and will be accepted for the Ph.D. program only on the condition of satisfactory completion of the M.A. degree with the department.

Candidates for the Ph.D. degree must complete the language requirements in both French and German not later than the beginning of the second year of residence.

## FIELD I. BIBLICAL STUDIES

201-202. FIRST HEBREW.—The principles and structure of the Hebrew language with translation of selected Old Testament narratives. 6 units.
PROFESSOR STINESPRING

207. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament prose (the Pentateuch and historical books in alternate years). First semester. 3 units. STAFF

208. SECOND HEBREW.—Historical Hebrew grammar with reading of Old Testament poetry (the Prophets and the Writings in alternate years). Second semester. 3 units. STAFF

209. BIBLICAL THEOLOGY.—A study of the Old and New Testaments in regard to their theological relationship. 3 units. PROFESSOR ANDERSON

217. THE NEW TESTAMENT IN GREEK.—Extensive reading of the Greek text of the New Testament, with special emphasis upon its interpretation. 3 units.

226. EXEGESIS OF THE GREEK NEW TESTAMENT I.—A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) 3 units.
PROFESSOR PRICE

227. EXEGESIS OF THE GREEK NEW TESTAMENT II.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) 3 units. PROFESSOR ANDERSON

228. THE THEOLOGY OF THE GOSPEL AND EPISTLES OF JOHN.—A study of the origin of these writings; the provenance of their thought forms and symbolism; their influence on the early church; and contemporary significance. 3 units. PROFESSOR PRICE

301. THE THEOLOGY OF THE DEAD SEA SCROLLS.—A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. 3 units. ASSISTANT PROFESSOR STRUGNELL

302. STUDIES IN THE INTERTESTAMENTAL LITERATURE.—Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to Post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 units. PROFESSOR ANDERSON

304. ARAMAIC.—A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 units.
PROFESSOR STINESPRING AND ASSISTANT PROFESSOR STRUGNELL

305. THIRD HEBREW.—An interpretative study of late Hebrew prose, with readings from Chronicles, Ecclesiastes, and the Mishnah. 3 units.
PROFESSOR STINESPRING

306. LANGUAGE AND LITERATURE OF THE DEAD SEA SCROLLS.—A study in interpretation. Prerequisite, a knowledge of Hebrew. 3 units.
ASSISTANT PROFESSOR STRUGNELL

307. SYRIAC.—A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 units. PROFESSOR STINESPRING

309. HISTORY OF THE ANCIENT NEAR EAST.—A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 units. PROFESSOR STINESPRING

310. OLD TESTAMENT PROPHECY.—The prophetic movement in Israel

with special emphasis on the theological standpoint of the prophets of the eighth century B.C. 3 units. PROFESSOR STINESPRING

317. THE SYNOPTIC GOSPELS.—A detailed study of their characteristics and contents, based upon the Greek text, with attention to their respective sources and to the development of synoptic criticism. 3 units.

318. TEXTUAL CRITICISM OF THE NEW TESTAMENT.—A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. 3 units. PROFESSOR CLARK

340-341. SEMINAR IN THE NEW TESTAMENT.—Research and discussion on a selected problem in the Biblical field. 2 units. PROFESSORS ANDERSON AND PRICE

## FIELD II. HISTORICAL STUDIES

234. THE THEOLOGY OF THOMAS AQUINAS.—A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 units. ASSISTANT PROFESSOR GRISLIS

240. THE THEOLOGY OF RICHARD HOOKER.—An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 units. ASSISTANT PROFESSOR GRISLIS

250. STUDIES IN MODERN CHURCH HISTORY, I. REFORMATION AND COUNTER-REFORMATION.—History and thought of European Christianity between 1517-1680. 3 units. ASSISTANT PROFESSOR HILLERBRAND

251. STUDIES IN MODERN CHURCH HISTORY, II: PIETISM AND RATIONALISM.—History and thought of Christianity on the continent of Europe between 1680-1800. 3 units. ASSISTANT PROFESSOR HILLERBRAND

260. SEMINAR: WESLEY STUDIES.—The lives and thought of John and Charles Wesley and their colleagues in relation to English culture and religion in the 18th century. 3 units. ASSOCIATE PROFESSOR BAKER

280. THE HISTORY OF RELIGIONS.—A study of the methodology of the history of religions, the nature of religious experience, and specific categories of religious phenomena. 3 units. ASSISTANT PROFESSOR SULLIVAN

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian sub-continent, with particular attention to religious movements and institutions. (Also listed as History 285.) 3 units. ASSISTANT PROFESSOR SULLIVAN

296. RELIGION ON THE AMERICAN FRONTIER.—A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. 3 units. ASSOCIATE PROFESSOR HENRY

322. NINETEENTH-CENTURY EUROPEAN THEOLOGY.—Protestant theology from Kant to Herrman together with representative British theologians. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR HERZOG

331. THE SOCIAL MESSAGE OF THE EARLY AND MEDIEVAL CHURCH.—A study of the social teachings and contributions of the Christian Church prior to the Protestant Reformation. 3 units. (Not 1964-65) PROFESSOR PETRY

332. THE MEDIEVAL CHURCH.—Outstanding characteristics of the Medieval Church, emphasizing theory, polity, institutions, sacraments, and worship. 3 units. PROFESSOR PETRY

334. CHURCH REFORMERS AND CHRISTIAN UNITY.—The work of such reformers as Marsilius of Padua, William Ockham, Jean Gerson, Pierre d'Ailly, and Nicholas of Cusa in relation to ecclesiastical schism and the search for Christian unity through representative councils. 3 units. (Not 1964-65) PROFESSOR PETRY

336. CHRISTIAN MYSTICISM IN THE MIDDLE AGES.—Source studies in historical perspective of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. 3 units. PROFESSOR PETRY

337. THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 3 units. ASSISTANT PROFESSOR HILLERBRAND

338. THE THEOLOGY OF JOHN CALVIN.—An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. 3 units.
ASSISTANT PROFESSOR GRISLIS

339. LEFT-WING MOVEMENTS OF THE REFORMATION.—A survey of the history and theology of the "radical" Reformation. 3 units. (Not 1964-65)
ASSISTANT PROFESSOR HILLERBRAND

387. CHRISTIAN ETHICS AND SOCIAL PHILOSOPHY.—Selected social philosophies from Locke to Sumner analyzed from the standpoint of Christian ethics. 3 units. ASSOCIATE PROFESSOR LACY

391. HISTORICAL TYPES OF CHRISTIAN ETHICS I.—A critical study of representative statements of Christian ethical theory, through the early Reformation. 3 units. (Not 1964-65) PROFESSOR BEACH

392. HISTORICAL TYPES OF CHRISTIAN ETHICS II.—A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 units. (Not 1964-65) PROFESSOR BEACH

395. CHRISTIAN THOUGHT IN COLONIAL AMERICA.—Exposition of the main currents in Protestant theology. 3 units. ASSOCIATE PROFESSOR HENRY

396. LIBERAL TRADITIONS IN AMERICAN THEOLOGY.—A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 units. ASSOCIATE PROFESSOR HENRY

## FIELD III. SYSTEMATIC AND CONTEMPORARY STUDIES

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. 3 units. ASSOCIATE PROFESSOR POTEAT

231. SEMINAR IN CHRISTIANITY AND CONTEMPORARY THOUGHT.—Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relevance for theological inquiry. 3 units. ASSOCIATE PROFESSOR POTEAT

248. THE THEOLOGY OF KARL BARTH.—An historical and critical study of the theology of Karl Barth. 3 units. ASSISTANT PROFESSOR OSBORN

292. CHRISTIAN ETHICS AND INTERNATIONAL RELATIONS.—An examination of Christian attitudes toward such issues as war and peace, the rule of law, foreign aid, and human rights; and the Church's contribution to international policies and institutions. 3 units. ASSOCIATE PROFESSOR LACY

303. DOGMA AND THE PROBLEM OF HISTORY.—The authority of Kerygma and the Word of God in contemporary European theology. 3 units.
ASSOCIATE PROFESSOR HERZOG

320. SEMINAR: SCHLEIERMACHER.—A critical examination of the dogmatic system. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR HERZOG

325. PHILOSOPHICAL THEOLOGY I.—Main problems in the history of philosophical theology. 3 units. PROFESSOR CUSHMAN

326. PHILOSOPHICAL THEOLOGY II.—Prolegomena to the system of Christian theology. 3 units. PROFESSOR CUSHMAN

328. TWENTIETH-CENTURY EUROPEAN THEOLOGY.—Critical examination of the thought of selected representative theologians. 3 units.
ASSOCIATE PROFESSOR HERZOG

333. SEMINAR: MARXIST IDEOLOGY AND CHRISTIAN FAITH.—Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. 3 units. ASSOCIATE PROFESSOR LACY

380. EXISTENTIALISM.—An exploration of the interests and motifs of Existentialism in relation to modern philosophy and theology through an analysis of representative writings of Kierkegaard, Heidegger, Berdyaev, Marcel, and Sartre. 3 units. ASSOCIATE PROFESSOR POTEAT

385. RELIGION IN AMERICAN LITERATURE.—A critical study of the meaning and value of religious motifs reflected in American literature. 3 units.
ASSOCIATE PROFESSOR HENRY

386. SEMINAR: THEOLOGICAL TRENDS IN THE WORLD CHURCH.—Contemporary currents of Christian thoughts as they affect resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 units. ASSOCIATE PROFESSOR LACY

389. CHRISTIAN ETHICS AND CONTEMPORARY CULTURE.—A study of the interaction between Christian thought and current secular social theory. 3 units. PROFESSOR BEACH

390. CURRENT PROBLEMS IN CHRISTIAN ETHICAL THEORY.—A critical study of dominant issues in Christian ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community, and vocation. 3 units. PROFESSOR BEACH

394. CHRISTIANITY AND THE STATE.—The relation of the Christian theory of the State to political problems, with special consideration of the religious assumptions underlying democratic theory and practice and of the relationship of church to state. 3 units. PROFESSOR BEACH

397. CONTEMPORARY AMERICAN THEOLOGY.—Critical appraisal of major tendencies. 3 units. ASSOCIATE PROFESSOR HENRY

398. COLLOQUIUM OF THE COLLEGE AND UNIVERSITY TEACHING OF RELIGION.—The theological issues of religion in higher education; a consideration of the curricular content of religion courses. Normally expected of Level III students in Fields I, II, and III in residence. PROFESSOR BEACH AND STAFF

## ROMANCE LANGUAGES

PROFESSOR DAVIS, CHAIRMAN—214 CARR; PROFESSOR CHERPACK, DIRECTOR OF GRADUATE STUDIES—201 CARR; PROFESSORS CASTELLANO, DOW, FEIN, PREDMORE, AND WARDROPPER; ASSOCIATE PROFESSORS CORDLE, GRANT, AND VINCENT; ASSISTANT PROFESSORS HULL AND TÉTEL

The Department of Romance Languages offers graduate work leading to the A.M. and Ph.D. degrees. In order to undertake graduate study in this Department, the student should normally have credit for four years of college courses in the chosen language, or 18 semester hours beyond the conventional two units offered at entrance to college. In addition to this minimum requirement, the student should have had one semester of review in composition and grammar.

It is recommended that candidates for the A.M. degree take a second Romance language as the minor subject.

A candidate for the Ph.D. degree will be required to take some training in Romance linguistics, the amount to be determined by the Department upon consideration of the student's preparation in the field, and a course in the methods of literary scholarship.

### FRENCH

FOR SENIORS AND GRADUATES

209. ADVANCED COMPOSITION AND SYNTAX.—A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 units. ASSISTANT PROFESSOR HULL

210. FRENCH PHONETICS.—The phonemic structure of contemporary French. Sounds, intonation. Practice transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 units.
ASSISTANT PROFESSOR HULL

213. FRENCH CLASSICISM.—Its initial phase. Reading from Malherbe, Balzac, Voiture, Descartes, Corneille, Molière, and others. 3 units. (1964-65)
PROFESSOR CHERPACK

214. FRENCH CLASSICISM.—Its maturity. Readings from Pascal, Racine, La Fontaine, La Rochefoucauld, Boileau, Bossuet, Madame de Sévigné, La Bruyére, Saint-Simon, and others. 3 units. (1964-65) PROFESSOR CHERPACK

219. OLD FRENCH LITERATURE.—An introduction to the reading of Old French literary texts. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR VINCENT

221. THE NINETEENTH-CENTURY FRENCH NOVEL.—Its initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 units. (1964-65) ASSOCIATE PROFESSOR GRANT

222. THE NINETEENTH-CENTURY FRENCH NOVEL.—Its continuation. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 units. (1964-65) ASSOCIATE PROFESSOR GRANT

225, 226. FROM RENAISSANCE TO BAROQUE IN FRENCH LITERATURE OF THE SIXTEENTH CENTURY.—First semester: Literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: Poetry and theater. Readings from Marot, Scève, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. (1964-65) ASSISTANT PROFESSOR TETEL

241, 242. FRENCH LITERATURE AND THOUGHT IN THE AGE OF ENLIGHTENMENT.—First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: The crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 units. (1964-65) PROFESSOR CHERPACK

245. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—1895-1925: the metamorphoses of symbolism. A study of the works of Proust, Gide, and Claudel. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR CORDLE

246. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—1925-1955: The existentialist conversion. A study of the work of Malraux, Sartre, Camus. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR CORDLE

FOR GRADUATES

311, 312. FRENCH SEMINAR.—Each semester one of the following topics will be selected for intensive treatment: (a) Studies in Sixteenth-Century Literature, (b) Studies in Eighteenth-Century Literature, (c) Studies in Nineteenth-Century Literature. (d) Studies in Seventeenth-Century French Literature, (e) Studies in Contemporary Literature. 3 units each semester.
PROFESSOR CHERPACK; ASSOCIATE PROFESSORS CORDLE AND GRANT

—.GRADUATE READING COURSE. An intensive course in French to develop rapidly the ability to read French in several fields. Graduate students only. No credit.

## SPANISH

FOR SENIORS AND GRADUATES

251. THE ORIGINS OF THE SPANISH NOVEL.—A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: the *Amadís de Gaula, Diego de San Pedro's La cárcel de amor,* the *Abencerraje,* the *Lazarillo,* Montemayor's *Diana.* 3 units. (Not 1964-65)
PROFESSOR WARDROPPER

252. SPANISH LYRIC POETRY BEFORE 1700.—A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor, la poesía de tipo tradicional,* and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 units. (1964-65) PROFESSOR WARDROPPER

253. THE ORIGINS OF THE SPANISH THEATER.—A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century) through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres Naharro, Lope de Rueda, Juan de la Cueva. 3 units. (Not 1964-65)
PROFESSOR WARDROPPER

255. MODERN LATIN-AMERICAN LITERATURE.—The coming of age of Latin-American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 units. (1964-65) PROFESSOR FEIN

256. CONTEMPORARY LATIN-AMERICAN LITERATURE.—Trends in Latin-American literature after the Modernist movement. Analysis of significant works in various genres. 3 units. (Not 1964-65) PROFESSOR FEIN

258. OLD SPANISH LITERATURE.—An introduction to the reading of Old Spanish literary texts. 3 units. (Not 1964-65) PROFESSOR DAVIS

259. SPANISH PHONETICS.—A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. 3 units.
PROFESSOR CASTELLANO

260. ADVANCED COMPOSITION AND SYNTAX.—Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. 3 units. PROFESSOR CASTELLANO

261. NINETEENTH-CENTURY NOVEL.—A study of literary and social trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo Barzán, Blasco Ibánez, and their contemporaries. 3 units. (1964-65) PROFESSOR DAVIS

264. MODERN AND CONTEMPORARY SPANISH THEATER.—A brief review of modern and contemporary Spanish theater from the period of Romanticism. Lectures, reading and discussion of the most representative works of Benavente, los hermanos Quintero, Garcia Lorca, Casona, etc. 3 units. (1964-65)
PROFESSOR CASTELLANO

265. GOLDEN AGE LITERATURE: CERVANTES.—The life and works of Cervantes with special emphasis on his *Quijote*. 3 units. PROFESSOR PREDMORE

266. GOLDEN AGE LITERATURE: THE DRAMA.—Study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 units. (Not 1964-65) PROFESSOR CASTELLANO

275. CONTEMPORARY SPANISH LITERATURE.—The essay and lyric poetry. A study of the revision of national values and literary expression in the twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extra-peninsular influences. 3 units. (Not 1964-65)
PROFESSOR PREDMORE

276. CONTEMPORARY SPANISH LITERATURE.—The novel. A study of tradition and innovation in the twentieth-century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 units. (Not 1964-65) PROFESSOR PREDMORE

FOR GRADUATES

321, 322. HISPANIC SEMINAR.—Each semester one of the following topics will be selected for intensive treatment: (a) The Spanish Language in America, (b) Studies in Medieval Literature, (c) Studies in the Literature of the Golden Age, (d) Studies in Latin American Literature, (e) Studies in the Spanish Renaissance and Baroque, (f) Studies in Spanish Poetry, (g) Studies in Nineteenth-Century Spanish Literature. 3 units each semester.
PROFESSORS CASTELLANO, DAVIS, FEIN, PREDMORE, AND WARDROPPER

## ROMANCE LANGUAGES

211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 3 units. PROFESSOR CHERPACK

218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 3 units. PROFESSOR DOW

224. ROMANCE LINGUISTICS.—The origin and development of the Romance languages from spoken Latin to the modern standard languages and local dialects. Introduction to contemporary methods in historical and comparative linguistics. 3 units. ASSISTANT PROFESSOR HULL

## RUSSIAN

ASSOCIATE PROFESSOR JEZIERSKI

No graduate degree is presently offered in Russian. The following courses may serve in the minor programs of students in other departments.

201, 202. THE NOVELISTS OF NINETEENTH-CENTURY RUSSIA.—Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English. Lectures, oral reports, class discussions, and term paper. 6 units. ASSOCIATE PROFESSOR JEZIERSKI

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR MCKINNEY, CHAIRMAN—2681 BUILDING #9; ASSOCIATE PROFESSOR KERCKHOFF, DIRECTOR OF GRADUATE STUDIES—271 BUILDING #9; PROFESSORS BACK, LA BARRE AND THOMPSON; ASSOCIATE PROFESSORS MADDOX, PREISS, ROWE, ROY, AND SMITH; ASSISTANT PROFESSORS SIMPSON AND WINSBOROUGH

The Department offers graduate work leading to the A.M. and Ph.D. degrees in Sociology. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. Applicants for admission should submit scores on the Graduate Record Examination.

Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree. Candidates for the Ph.D. degree are expected to have a broad background in the various aspects of sociology—substantive, theoretical, and empirical. The program of each candidate is determined by a committee which reviews his previous work and sets the specific requirements to be met. These requirements will include work in related fields such as psychology, philosophy, mathematics, economics, or political science. Emphasis is placed on the completion of the dissertation, directed by a member of the staff, demonstrating competence and independence in the investigation of an original and significant problem.

Further details of the program, the departmental facilities, the staff, and various stipends available are described in a brochure which may be obtained from the Director of Graduate Studies in Sociology.

FOR SENIORS AND GRADUATES

232. PRIMITIVE RELIGION.—The ethnography, the social functions, and the socio-psychological meanings of religion in primitive societies. 3 units. PROFESSOR LA BARRE

234. PERSONALITY AND SOCIETY.—The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 units. PROFESSOR LA BARRE

236. PERSONALITY AND CULTURE.—The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comprehensive anthropological materials will be drawn upon. Prerequisite: Course 234. 3 units. PROFESSOR LA BARRE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 units. ASSOCIATE PROFESSOR ROY AND ASSISTANT PROFESSOR SIMPSON

242. THE SOCIOLOGY OF OCCUPATIONS AND PROFESSIONS.—The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 units. PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR ROY

243. POPULATION DYNAMICS AND SOCIAL CHANGE.—The aim of this course is to introduce the student to the facts and techniques of demographic analysis, and to provide an understanding of the relationship between the demographic structure of society and its social organization. 3 units. ASSISTANT PROFESSOR WINSBOROUGH

245. DEVIANT SOCIAL BEHAVIOR.—Analysis of deviant behavioral systems (illness, crime, delinquency, etc.) in terms of a) precipitating social factors, b) patterns and goals, c) remedial and counteracting controls. 3 units.
ASSOCIATE PROFESSOR PREISS

247. COMMUNITY AND SOCIETY.—This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, news, mass behavior, social problems, races and classes. 3 units.
PROFESSOR THOMPSON AND ASSISTANT PROFESSOR SIMPSON

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 3 units. PROFESSOR THOMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 3 units.
PROFESSOR THOMPSON

275. SOCIAL ATTITUDES AND INDIVIDUAL BEHAVIOR.—Such issues as the following are considered: the importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the importance of membership groups and reference groups. 3 units. PROFESSOR BACK AND ASSOCIATE PROFESSOR KERCKHOFF

278. SOCIAL STRUCTURE AND THE LIFE CYCLE.—A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 units. ASSOCIATE PROFESSOR MADDOX

281. DEVELOPMENT OF SOCIOLOGICAL THEORY.—An analysis of the development, convergence and utilization of sociological theory. Prerequisite: 15 s.h. credit in sociology. 3 units. PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR PREISS

282. PRINCIPLES OF SOCIOLOGICAL ANALYSIS.—An advanced course in general sociology designed to give a systematic conception of social order, focusing on its structural components and the functions they serve. Undergraduates must have at least 15 s.h. and a B average in sociology and have the permission of the instructor. 3 units.* PROFESSOR THOMPSON

295. METHODOLOGY IN SOCIOLOGY.—Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 units. ASSOCIATE PROFESSOR SMITH

297. STATISTICAL ANALYSIS IN SOCIOLOGY.—Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance and covariance and factorial design are studied. Where possible, analogous non-parametric techniques are also considered. Prerequisite: Mathematics 233 or an equivalent course. Undergraduates must have at least 15 s.h., a B average in sociology and obtain the permission of the instructor. 3 units.
ASSISTANT PROFESSOR WINSBOROUGH

FOR GRADUATES

330. SEMINAR IN ANTHROPOLOGY.—A seminar for advanced students who wish to pursue individual studies in racial and cultural anthropology. Offered both semesters. 1 to 3 units each semester. PROFESSOR LA BARRE AND ASSOCIATE PROFESSOR ROWE

341. SPECIAL PROBLEMS OF COMPLEX SYSTEMS.*
(a) INDUSTRIAL AND PROFESSIONAL SYSTEMS.—Analysis of problems of organization of work in such diverse settings as industrial plants, hospitals, and public administration groups. Problems of decision-making, recruitment, allocation of authority, informal organization, interorganizational relations. 3 units.
PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR ROY

(b) MASS COMMUNICATIONS.—Theoretical problems in defining and distinguishing communication, communicative acts, communication processes, and communication systems. Work aimed toward the derivation of models and theories for each of these will be pursued. Students must have permission of the instructor or have had at least 6 units in some of the following courses: 142, 171, 172, 275, 373, 374. 3 units. ASSOCIATE PROFESSOR SMITH

(c) URBAN SOCIETY.—Analysis is made of the varying mechanisms through which urban society is integrated, how urbanites develop a sense of identification with the community, and the extent and mode of social dominance of the city in the larger society. 3 units. PROFESSOR THOMPSON AND ASSOCIATE PROFESSOR SMITH

(d) HUMAN ECOLOGY.—An examination of such issues as: the logic and utility of the ecological approach; the possibility of testing current ecological theories in non-western, non-urban environment; alternative explanations for the spatial patterning of social phenomena; selected methodological problems. 3 units. PROFESSOR THOMPSON, ASSOCIATE PROFESSOR SMITH, AND ASSISTANT PROFESSOR WINSBOROUGH

351, 352. SEMINAR IN SOCIAL ORGANIZATION.—Examination of such problems as the bases of social cohesion and continuity, the sources and effectiveness of social control mechanisms, the problem of social change in structural-functional theory. 3 units each semester.

PROFESSORS MCKINNEY AND THOMPSON AND ASSOCIATE PROFESSOR MADDOX

373, 374. SOCIAL PSYCHOLOGICAL ISSUES IN SOCIOLOGY.—Detailed exploration of selected problem areas such as the theory and measurement of social attitudes, role discontinuity and personality disorders, applications of reference group theory, the socialization process. Students must have permission of the instructor or have had at least 6 units in some of the following courses: 142, 171, 172, 275, 341b. 3 units each semester.

PROFESSOR BACK AND ASSOCIATE PROFESSOR KERCKHOFF

385, 386. SEMINAR IN SOCIOLOGICAL THEORY.—Detailed analysis of methodological and substantive problems in utilizing comprehensive, middle-range, and discrete theories in varied sociological areas. Major emphasis on the use of theory in empirical research. Open to students who have had 281 or its equivalent. 3 units each semester. PROFESSORS MCKINNEY AND ASSOCIATE PROFESSOR PREISS

392. INDIVIDUAL RESEARCH IN SOCIOLOGY.—Students will conduct on an individual basis research designed to evaluate a sociological hypothesis of their choice. The process must be completed by preparation of a report on this research in adequate professional style. Prerequisite: Sociology 295 or permission of the instructor. 3 units each semester.

PROFESSORS BACK, ASSOCIATE PROFESSORS SMITH AND KERCKHOFF

397, 398. SEMINAR IN SPECIAL RESEARCH PROBLEMS.—Treatment in depth of either selected methodological issues and/or methods. Examples of possible topics include scaling, methods of machine data processing, validation and induction, quantification, interviewing, measurement, sampling plans, development of research designs from statistical models, methodological research, experimental techniques, the relation of theory to research, and the role of statistical methods in sociology. Open to students by permission of the instructor. 3 units each semester.* PROFESSOR BACK, ASSOCIATE PROFESSORS KERCKHOFF AND SMITH

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN. 3 units.*

PROFESSOR BRAIBANTI, VISITING PROFESSOR ISLAM, AND ASSOCIATE PROFESSOR ROWE

## ZOOLOGY

PROFESSOR HORN, CHAIRMAN, 227 BIOLOGICAL SCIENCES BUILDING; ASSOCIATE PROFESSOR ROBERTS, ACTING DIRECTOR OF GRADUATE STUDIES, 044 BIOLOGICAL SCIENCES BUILDING; PROFESSORS BOOKHOUT, GRAY, GREGG, MENZIES, SCHMIDT-NIELSEN, WILBUR; ASSOCIATE PROFESSORS BAILEY, FLUKE, HUNTER, KLOPFER, LIVINGSTONE, VERNBERG, WARD; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSOR COSTLOW

To undertake study toward an advanced degree in zoology, a student should have completed an undergraduate major in zoology or its equivalent. This normally

amounts to 24 or more hours for course work distributed among various fields of zoology. The department recognizes the trend in modern biology towards interdisciplinary research and part of the zoology requirements may be replaced by advanced work in chemistry, mathematics, physics, etc.

Required work for the A.M. degree ordinarily includes 12 units of advanced course work in zoology, 6 units of course work in a minor department, and an additional 6 units of advanced work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and a dissertation based on original work. Minor work is available in many fields, including anatomy, biochemistry, botany, chemistry, physics, physiology and psychology.

FOR SENIORS AND GRADUATES

201. ANIMAL BEHAVIOR.—A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: Physiology, Genetics and Evolution, or consent of instructor. 3 units; 4 units with laboratory. (Not 1964-65) ASSOCIATE PROFESSOR KLOPFER

203. ECOLOGY.—Relation of animals to environment. Lectures, reading, reports, conferences; laboratory and field work. 4 units. PROFESSOR GRAY

210. EXPERIMENTAL GENETICS.—The relationship of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Laboratory. Prerequisites; Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent) or consent of instructor. 4 units. (1964-65) ASSOCIATE PROFESSOR WARD

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 4 units. (*Given at Beaufort.*) PROFESSOR MENZIES

216. LIMNOLOGY.—A study of lakes, ponds, and streams, including their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities living in them. Lectures, field trips, laboratory work. Prerequisites: one year each of biology, chemistry, and physics and Mathematics 21; or permission of instructor. 4 units. (1964-65) ASSOCIATE PROFESSOR LIVINGSTONE

222. ENTOMOLOGY.—Anatomy, physiology, embryology, and classification of insects. Prerequisite: one year of zoology. 4 units.* PROFESSOR GRAY

224. VERTEBRATE ZOOLOGY.—A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 units. (Not 1964-65) ASSOCIATE PROFESSOR BAILEY

228. EXPERIMENTAL EMBRYOLOGY.—Lectures, readings, reports, and laboratory work. 4 units. (Not 1964-65) PROFESSOR GREGG

238. SYSTEMATIC ZOOLOGY.—The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisite: Zoology 1, 2. 4 units. (1964-65) ASSOCIATE PROFESSOR BAILEY

243. CYTOLOGY.—The structure of the cell. Lectures, readings, reports, and laboratory work. Prerequisites: Zoology 53, 92, 156, or equivalent and consent of instructor. (This is the same course as Botany 203.) 4 units. ASSOCIATE PROFESSOR ROBERTS

245. RADIATION BIOLOGY.—Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: college physics and mathematics, organic chemistry. 3 units, or 4 units with laboratory. (Not 1964-65) ASSOCIATE PROFESSOR FLUKE

246. MOLECULAR BIOLOGY.—The nature, functional relationships and replication of biological structure of the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 units, or 4 with instructor's advanced approval of laboratory work. (1964-65)

ASSOCIATE PROFESSOR FLUKE

247. BIOLOGICAL NUCLEONICS.—Laboratory instruction in biological uses of radioactive tracers, primarily with microörganisms, in counting instruments and measurements, and in legal requirements. Prerequisites: by consent of the instructor and normally two years of biology and one year of college chemistry. 2 units. (Not 1964-65)

ASSOCIATE PROFESSOR FLUKE

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla from various habitats are studied. Prerequisite: A course in physiology. 6 units. (*Given at Beaufort*)

ASSOCIATE PROFESSOR VERNBERG

252. COMPARATIVE PHYSIOLOGY.—The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 units.

PROFESSOR SCHMIDT-NIELSEN

253. ADVANCED VERTEBRATE MORPHOLOGY.—Descriptive and experimental studies in comparative vertebrate morphogenesis. Lectures, readings, reports, and laboratory. Prerequisites: Zoology 53, 92. 4 units.* PROFESSOR HORN

271. CELLULAR PHYSIOLOGY.—The physiological processes of living matter approached through studies of cells. Prerequisites: two years of biology and at least one year of chemistry. 4 units. PROFESSOR WILBUR; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN

274. INVERTEBRATE ZOOLOGY.—A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Zoology 1 and 2. 4 units.* (See also Marine Laboratory)

PROFESSOR BOOKHOUT

276. PROTOZOOLOGY.—The morphology, physiology, taxonomy, and culture of protozoa. Prerequisites: Zoology 1 and 2. 4 units.* PROFESSOR BOOKHOUT

278. INVERTEBRATE EMBRYOLOGY.—Lectures, readings, and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 units.* PROFESSOR BOOKHOUT

FOR GRADUATES

351, 352. DEPARTMENTAL SEMINAR.—A weekly meeting of graduate students and faculty to hear reports and to discuss biological facts, theories, and problems. One hour a week throughout the year. 1 unit credit by arrangement.

ALL MEMBERS OF THE GRADUATE STAFF

353, 354. RESEARCH.—Students who have had proper training may carry on research under direction of members of the staff in the following fields: (A) Embryology, (B) Physiology, (C) Cytology, Histology, (D) Invertebrate Zoology, (E) Ecology, (F) Morphology, (G) Parasitology, (H) Vertebrate Zoology, (I) Limnology, (J) Entomology, (K) Genetics, (L) Biophysics, (M) Animal Behavior, (N) Systematics, (O) Oceanography. Hours and credits to be arranged.

ALL MEMBERS OF THE GRADUATE STAFF

355, 356. SEMINAR.—One or more seminar courses in particular fields are given each semester by various members of the staff. These will be in the fields indicated under courses 353-354 above. 2 units.

MARINE LABORATORY.—The following courses will be given at Duke University Marine Laboratory, Beaufort, N. C., during the summer of 1964: 203, Marine Ecology; 214, Biological Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology.

## MEDICAL SCHOOL

The facilities of the several Departments of the Medical School listed below and alphabetically as departments are available to qualified graduate students, already admitted to the Graduate School, for independent or supervised research and investigation, whether or not they are working toward advanced degrees.

Graduate students wishing to pursue a major or minor on any of the following departments, or to enroll in any of the courses listed elsewhere, should consult or write the appropriate Director of Graduate Studies.

Because of the special schedules maintained in the Medical School, graduate students should write the Directors to ascertain the precise dates when courses are offered.

ANATOMY (see p. 59)
BIOCHEMISTRY AND NUTRITION (see p. 61)
MICROBIOLOGY AND IMMUNOLOGY (including MYCOLOGY, PARASITOLOGY, and HEMATOLOGY (see p. 91)
PHYSIOLOGY and PHARMACOLOGY (see p. 97)

## MASTER'S DEGREE FOR STUDENTS SPECIALIZING IN PHYSICAL THERAPY

Students specializing in physical therapy may request admission to the Graduate School and if admitted follow the curriculum for the Master of Arts degree of either the Anatomy or Physiology Department. Selected physical therapy subjects are integrated with the graduate courses the first year. A thesis and the remaining physical therapy courses and practicum may be completed the second year. Upon satisfactory completion of the requirements a Master of Arts degree and a Certificate in Physical Therapy will be awarded. For information concerning the Physical Therapy Program write Miss Helen Kaiser, Director, Physical Therapy Department, Box 3247, Duke University Medical Center.

## ADVANCED DEGREES CONFERRED SEPTEMBER 1, 1963

### MASTER OF ARTS

James Ross Bailey
Marilyn Ann Burkholder
John J. Canning
Raymond W. Champagne, Jr.
Carolyn Bowman Clark
Robert Lee Collett
Arnold Cooper
Robert Britton Dove
Benjamin Franklin Fisher
Lois Duncan Gunn
Edward Hayes Hagerman
William Styron Harris, Jr.
Margaret Norman Harrison
David Caldwell Howard
Joyce Clydene Miller Huntley
Cyrus Kapadia
Ellen Brauer Kaplan
Katherine Ann Kowal
Roberta Brodie Langford
Jean R. Matsunami
Lynn L. Meister
Christian Harry Miller
Helen Evans Misenheimer
William Lee Pickett, Jr.
Deborah Burnham Printz
Agnes Reaves
Anne Herndon Rogers
Lou Ella Hicks Smith
Russell Paul Sparling
Betty Jean Steele
Gordon Lamar Teffeteller
Jeanette Gail Walker
Mary E. C. Whaley

### MASTER OF ARTS IN TEACHING

Elizabeth P. Adams
Linda S. Adams
Jane Raine Akslen
Rosemary V. Alcorn
Louise Alma
Jimmy Davis Baggett
Linda Bolick Barnett
Robert C. Biche
Joseph George Bogdan
Sandra Pearl Boger
James Ward Brock
Howard Henry Burd
Leslie H. Burton
Nancy L. Carmack
Mary E. Cartwright
Richard Gordon Cashwell
John L. Chittenden
Miriam E. Cooper
Edward Duvall
Martha E. Dye
Mary Frances Edens
Linda M. Emery
Richard T. Falcone
Lois E. Follstaedt
Orville Richard Forsythe
Kathryn Aldridge Freeman
John L. Frye
LaRose Fulmer
Larry Lee Garrett
Thomas F. Gordon
William M. Gordon
Nancy Jean Harling
Patsy E. Hatcher
Gary M. Hipps
Katherine D. Horne
Wendell Lee Howard
Jean E. Johnson
Edward Lee Laughinghouse
Helga Leftwich
Margaret Lehmann
Beverly Yvonne Linton
Christina C. Looper
Linda Cale Losack
Linda E. Lunsford
Hilda Jo Maness
Robert Anthony Martin
Russell Melroy Miner
Harry G. Moore
Barry C. Newton
Terrell A. Nisewaner
Jane A. Noble
Margaret S. Overton
William Scott Penn
Grace Bulla Perkinson
Willis A. Perry
Harold Wayne Quinton
Merle L. Riggs
Joanne D. Rodgers
John Ray Ross
Stanley Sawicki
Virginia Schoenly
Charles Courtney Senn
Woodrow M. Smith
Ann Newton Thompson
John R. Thompson
Robert Penn Thompson
Johnson M. C. Townsend, Jr.
Jane Harris Triol
Margaret D. Tyndall
Thomas Noble Walters
John H. Weber
Mollie Stell Wiggins
A. Morris Williams, Jr.
George Kirtley Williams
Leonard B. Williams, III
William H. Young, Jr.
Sandra Yount
E. Virginia Yutz

## MASTER OF EDUCATION

James Lee Bonnette
Terry Cherniak
Hazel Joan Hall
Frederick Perry Love
Ernest W. Martin
June Potter
Joseph E. Sink
William E. Watson
Gladys S. Whittenton
Guy King Yeatts

## MASTER OF SCIENCE

Jimmy Piroshaw Balsara
Andrew Lowery
Robert J. Solomonic
David Wilson Varn

## DOCTOR OF EDUCATION

Mary Jane Green Hamilton, B.S., Winthrop College; M.Ed., University of South Carolina
(Education) Dissertation: "A Study of Dropouts from the White Public Schools of South Carolina"

J. Allen Norris, Jr., A.B. Duke University
(Education) Dissertation: "Positions Taken by Governors Pertaining to School Term Extension as a Factor in the Equalization of Rural and City Educational Opportunity in the Public Schools of North Carolina, 1924-1943"

## DOCTOR OF PHILOSOPHY

Albert Yves Bodart, LL.D. Universite Catholique de Louvain, Belgium; M.A., Marquette University
(Economics) Dissertation: "Economics of Shiftwork"

Louis Cantor, B.S., Memphis State College
(History) Dissertation: "The Creation of the Modern National Guard: The Dick Militia Act of 1903"

James Thomas Clemons, A.B., Hendrix College; B.D., Perkins School of Theology
(Religion) Dissertation: "Studies in the Syriac Text of Galatians"

Richard D. Goff, A.B., Duke University
(History) Dissertation: "Logistics and Supply Problems of the Confederacy"

Alf Andrew Heggoy, B.A., Randolph-Macon College
(History) Dissertation: "The Colonial Policies of Gabriel Hanotaux in Africa, 1894-1898"

Clinton Edward Hollandsworth, Jr., B.S., M.S., Virginia Polytechnic Institute
(Physics) Dissertation: "Elastic and Inelastic Scattering of Fast Neutrons from Heavy Weight Nuclei"

Edward S. Katkin, B.A., City College of New York
(Psychology) Dissertation: "The Relationship Between Self-Report and Physiological Indices of Anxiety During Differentially Stressful Conditions"

Lonnie Dean Kliever, B.A., Hardin-Simmons University; B.D., Union Theological Seminary
(Religion) Dissertation: "Methodology and Christology in H. Richard Niebuhr"

Lionel Garland Klikoff, B. A., University of California; M.A., Washington State University
(Botany) Dissertation: "Microenvironmental Influence on Vegetational Pattern Near Timberline in the Sierra Nevada"

Harry Stites Larsen, B.S., Rutgers University; M.S., Michigan State College
(Forestry) Dissertation: "Studies on the Relative Drought Resistance of Some Southern Oaks"

David Andrew Mathewes, Jr., B.S., Davidson College; M.S., Kansas University
(Chemistry) Dissertation: "Some Novel Heterocyclic Compounds of Phosphorus: Derivatives of Phosphacyclopentene-3 and of 1-Phosphabicycle (2.2.2.) Octane"

John Andrew Morgan, Jr., B.A., Stetson University
(Political Science) Dissertation: "Judicial Freedom in Statutory Interpretation"

Joseph Osinchak, B.A., Susquehanna University
(Anatomy) Dissertation: "A Fine Structure and Cytochemical Study of Neurosecretory Cells in the Supraoptic Nucleus of the Rat"

David Albert Parton, B.A., Willamette University
(Psychology) Dissertation: "An Experimental Approach to the Conflict Model of Aggressive Response Strength"

Theo Clyde Pilkington, B.E.E., North Carolina State College
(Electrical Engineering) Dissertation: "A Model for Predicting Magnetic Properties of Ferromagnetic Alloys as a Function of Temperature"

William Conrad Pinschmidt, Jr., B.A., Mount Union College; M.S., The Ohio State University
(Zoology) Dissertation: "Distribution of Crab Larvae in Relation to Some Environmental Conditions in the Newport River Estuary, North Carolina"

Walter Paschal Reeves, Jr., A.B., M.S., University of Alabama; Th.M., Southern Baptist Theological Seminary
(English) Dissertation: "Race and Nationality in the Works of Thomas Wolfe"

Richard E. Shore, B.A., College of Pacific
(Philosophy) Dissertation: "An Electrophoretic Analysis of Protein Development in Normal and Hybrid Frog Embryos"

Patrick Michael Sowle, B.S., Illinois State Normal University
(History) Dissertation: "The Conciliatory Republicans During the Winter of Secession"

Diane TeStrake Wagner, B.S., University of Florida; M.A., Duke University

(Botany) Dissertation: "Incidence, Developmental Morphology, and Systematic Position of *Leptosphaeria Discors* (Saccardo and Ellis) Saccardo and Ellis"

James Keith Zink, B.A., M.A., Harding College; B.D., Crozer Theological Seminary
(Religion) Dissertation: "The Use of the Old Testament in the Spoerypha"

## ADVANCED DEGREES CONFERRED JUNE 1, 1963

### MASTER OF ARTS

Bera Lucille Arnn
Anwar Masih Barkat
Rahendra Sahai Bhatnagar
Margaret A. Bird
Robert Hoyt Block
Alan Vance Briceland
Marvin Franklin Burgess
Jane Helen Carroll
Derek John Cash
Udhai Chanphaka
Maria Mercedes Clintron-Rios
Bruce Lynn Clayton
George Burtis Clemans
Francis A. D'Anzi
Thomas Harold Folwell
William Osborne Goode
John Starke Gordon
Patricia Carol Guess
Elizabeth Ann Hall
Douglas Irving Hodgkin
Robert Arthur Hohner
Nadia Khalaf
Susan Frances King
William E. King
John D. Kirkland, Jr.
Elizabeth Lee Klepper
Eleanor Sue Knight
Edward Byron Knipling
Ricardo Froilan Lagos
Alphonse J. Langlois
John Perry Leavell, Jr.
Frank Lentricchia
Delmar Frederick Lohr
Peter K. Manning
William Ray Marty
John Harmon McElroy
Frank Hamilton McGregor, Jr.
Arnold Brian Myers
Louisa Warnell Neal
Bernard F. Oppel
Denny E. Pilant
W. H. Purcell, Jr.
Clark Gilbert Reynolds
Harlan J. Reynolds
Napier Shelton
James Pressly Sherer
William M. Stuart
Eugene R. Sullivan
Kanwal K. Suri
Agnes Anne Trotter
Thomas A. Van
James Donald Watson
Donald Bowie Webber
George Wend
John E. Woodham

### MASTER OF ARTS IN TEACHING

Iris Boland Abernathy
Laurel Greene Breuer
Arline Turner Fonda
Elizabeth L. Fortney
Preston A. McLendon
Margaret M. Welsh

### MASTER OF EDUCATION

Jacob E. Adams
Richard Scott Craddock
Betty Glass Debnam
Betty Brown Denny

### MASTER OF SCIENCE

Roy Baxter Blake, Jr.
Martin G. Buehler
James B. Carpenter
Richard Clarke Gwaltney
Cheng-Chang Hu
Charles William Rose
Philip Cox Smith

### DOCTOR OF EDUCATION

Virginia Anne Flowers, A.B., Florida State University; M.Ed., Auburn University
(Education) Dissertation: "The Legal Aspects of Pupil Control"

Evelyn Rebecca Fulbright, A.B., Marshall College; M.A., Marshall College
(Education) Dissertation: "Judicial Decisions Relation to the Curriculum of the Public Schools"

W. Conard Gass, Th.B., Southern Baptist Theological Seminary; M.A., University of Louisville
(Education) Dissertation: "Herbert Baxter Adams and the Development of Historical Instruction in American Colleges and Universities"

Linwood E. Kent, B.S., Virginia Polytechnic Institute; M.S., Longwood College
(Education) Dissertation: "Vocational Agriculture in Virginia since 1917, with Recommendations for Future Development"

Allan Rhinehart Sharp, A.B., Transylvania College; B.D., The College of the Bible
(Education) Dissertation: "A Study of Protestant Undergraduate Pre-Theological Education in the United States"

Philip D. Vairo, B.A., Hunter College; M.A., New York University
(Education) Dissertation: "A Comparative Study of the Qualifications and Salaries of Teachers in Two-Year Colleges and Teachers Giving Instruction to Freshmen and Sophomores in Four-Year Colleges in North Carolina"

### DOCTOR OF PHILOSOPHY

Robert Revis Adams, B.S., Virginia Polytechnic Institute
(Chemistry) Dissertation: "Kinetics of the Condensation Reaction Between Methyl Ketones and Esters"

A.S.M. Mohiuddin Ahmed, I.A., Feni College; B.A., M.A., Dacca University
(Economics) Dissertation: "The Population of Pakistan: Past and Present"

Douglas R. Allenson, M.S., Oregon State University
(Chemistry) Dissertation: "The Stability and Characteristics of the Discharge Reaction of the Manganese Dioxide Electrode"

Marvin Windel Barker, B.A., Southern Illinois University
(Chemistry) Dissertation: "Oxidation of Some Aromatic Azonia Salts"

Thomas Rex Beard, B.S., M.A., Louisiana State University
(Economics) Dissertation: "Counter-Cyclical Debt Management—With Particular Emphasis on the Period, March, 1951-December, 1959"

Lenore Balsam Behar, B.A., Duke University
(Psychology) Dissertation: "The Influence of Cognitive Dissonance on Emotional Behavior"

Lois Ann Brockhoff, A.B., Stanford University
(Psychology) Dissertation: "Generalization, Extinction, and Acquisition of Conditioned Eyelid Responses Following an Increase in the Interstimulus Interval"

Salvatore George Buccino, B.S., Yale University
(Physics) Dissertation: "Elastic and Inelastic Scattering of Fast Neutrons from Medium Weight Nuclei"

Glen T. Cain, A.B., M.A., Baylor University; B.D., Th.M., Southwestern Baptist Seminary
(Religion) Dissertation: "The Place of Christ in the Theology of Rufus M. Jones"

Jefferson Holland Campbell, B.A., Southern Methodist University; B.D., Perkins School of Theology
(Religion) Dissertation: "Orestes Brownson's Doctrine of Communion"

Stephan R. Cavior, B.A., Swarthmore College
(Mathematics) Dissertation: "Equivalence Classes of Functions Over a Finite Field"

Edwin M. Curley, A.B., Lafayette College
(Philosophy) Dissertation: "Spinoza's Metaphysics: An Interpretation"

Walter F. Daves, A. B., M.A., Emory University
(Psychology) Dissertation: "An Experimental Analysis of Perceptual Discrimination in the Cat: The Effective Properties of Objects and the Discriminatory Behavior of the Animal"

Keith Eugene Davis, A.B., Duke University
(Psychology) Dissertation: "Impressions of Others and Interaction Context as Determinants of Social Interaction and Perception in Two-Person Discussion Groups"

Donald Sterling Douglas, A.B., Oberlin College
(Zoology) Dissertation: "Salt and Water Metabolism of the Adelie Penquin"

Frances Yeager Dunham, A.B., Duke University
(Psychology) Dissertation: "The Effect of Verbal and Material Flattery on the Performance of Girls Differing in Reported Extent of Material Love-Oriented Discipline"

Harry Thomas Frank, B.A., Wake Forest College; B.D., Yale University
(Religion) Dissertation: "The Place, Thought, and Significance of Maurice Goguel in New Testament Studies"

Robert Loyal Ganyard, A.B., M.A., University of Buffalo
(History) Dissertation: "North Carolina During the American Revolution: The First Phase, 1774-1777"

Kenneth Jay Gergen, B.A., Yale University
(Psychology) Dissertation: "Interaction Goals and Personalistic Feedback as Factors Affecting the Presentation of Self"

Robert H. Grimm, A.B., University of Miami
(Philosophy) Dissertation: "Subject-Predicate Sentences"

Joseph Howe Hadley, Jr., B.S., M.S., University of Alabama
(Physics) Dissertation: "Electron Spin Resonance Studies of Irradiated Biological Sulfur Compounds"

Glenn T. Harper, B.A., Furman University
(History) Dissertation: "German Economic Policy in Spain During the Spanish Civil War, 1936-1939"

David R. Hayes, A.B., Duke University
(Mathematics) Dissertation: "The Distribution of Irreducibles in GF (q,x)"

Thomas Edward Holland, B.S., M.S., University of Tennessee
(Economics) Dissertation: "Forecasting Interest Rate Movements: Time Series Analyses and Functional Relationships"

John E. Howell, A.B., Stetson University; B.D., Yale Divinity School
(Religion) Dissertation: "A Study of the Theological Method of Horace Bushnell and Its Application to His Cardinal Doctrines"

James Neal Huffaker, A.B., University of Chicago; M.S., Emory University
(Chemistry) Dissertation: "Kinetics of the Condensation Reaction Between Methyl Ketones and Esters"

Ardith Brask Johnsen, B.S., M.S., University of Michigan
(Botany) Dissertation: "Bryological and Lichenological Studies of West Fork, Arizona"

Cyrus Murray Johnson, B.S., Wake Forest College; M.A.S.A., Ohio State University; M.Ed., Duke University
(Sociology) Dissertation: "Family Patterns and Occupational Success Orientation"

Walter Livezey Johnson, A.B., Johns Hopkins University
(Economics) Dissertation: "Comparability of Structures of Interest Rates"

Edward Brodus Jones, B.A., Furman University; M.A., University of North Carolina
(History) Dissertation: "The Imperial Ideas of Henry Dundas and British Expansion in the East, 1783-1801"

Alonzo Williams Kenion, A.B., M.A., Duke University
(English) Dissertation: "The Influence of Criticism Upon English Tragedy, 1700-1750"

James C. Kimberly, B.A., Emory University
(Sociology) Dissertation: "An Experimental Test of a Theory of Status Equilibration"

Elizabeth Norfleet King, A.B., Randolph-Macon Woman's College; M.A., Wellesley College
(Zoology) Dissertation: "The Effects of Osmotic Changes on Respiration in Four Decapod Crustacea: A Comparison of Intact Animals, Excised Tissue and Isolated Mitochondria"

Lunsford Richardson King, B.S., Davidson College
(Mathematics) Dissertation: "On PHI-Compactifications"

Annette Grossman Kirshner, B.S., The City College of New York
(Biochemistry) Dissertation: "The Dissociation of Hemoglobin in Aqueous Sodium Chloride Solution and Other Solvents"

Sheldon F. Koesy, LL.B., University of Miami; B.D., Columbia Theological Seminary; M.A., East Carolina
(History) Dissertation: "Continuity and Change in North Carolina, 1775-1789"

Arthur Z. Kovacs, A.B., Wabash College
(Physics), Dissertation: "Charge Symmetry of K and K Mesons in Associated Production"

Quentin Guild Kraft, A.B., Brown University
(English) Dissertation: "A Study of Point of View in Selected Short Stories of Henry James"

Douglas M. Lawson, B.A., Randolph-Macon College; B.D., Drew Theological Seminary
(Religion) Dissertation: "The Idea of Progress in The Theology of Harry Emerson Fosdick"

John William Ledbetter, Jr., B.S., The Citadel
(Chemistry) Dissertation: "Spectrophotometry and Fluorometry of Salicylidene-o-Aminophenol and Related Compounds"

Francis Bullitt Lowry, A.B., Transylvania College
(History) Dissertation: "The Generals, The Armistice, and The Treaty of Versailles, 1919"

Frances Gray Mark, B.S., University of Richmond
(Chemistry) Dissertation: "Light Scattering Investigations in the Visible and Near Ultraviolet: The Conformation of Polystyrene in Dilute Solution"

Bettie Sue Siler Masters, B.S., Roanoke College
(Biochemistry) Dissertation: "The Mechanism of Hepatic Microsomal Triphosphopyridine Nucleotide-Cytochrome Reductase"

R. Bruce Masterton, B.A., Cornell University; M.A., University of Chicago
(Psychology) Dissertation: "The Neural Mechanisms of Sound Localization: The Effect of Auditory Cortex Ablation on the Ability of Cats to Discriminate Binaural Time Disparities"

Owen Link McConnell, B.S., Duke University
(Psychology) Dissertation: "Perceptual and Verbal Mediation in the Concept Learning of Children"

Edward Towson Moore, B.S., Virginia Polytechnic Institute
(Electrical Engineering) Dissertation: "Static Electrical-To-Electrical Energy Conversion From Direct Current Sources"

Ted Daniel Murphy, A.B., Duke University
(Zoology) Dissertation: "Amphibian Populations and Movements at a Small Semi-Permanent Pond in Orange County, North Carolina"

Noland Patrick Murray, B.A., Baylor University; B.D., Southern Baptist Theological Seminary
(Religion) Dissertation: "Personalism in the Ethical Theory of Emil Brunner"

James H. O'Donnell III, A.B., Lambuth College
(History) Dissertation: "The Southern Indians in the War of Independence, 1775-1783"

Norman LaCour Olsen, Jr., A.B., Dartmouth College
(English) Dissertation: "The Forum as a Magazine of Literary Comment: 1886-1907"

James Crowder Parham II, B.S., Bates College
(Chemistry) Dissertation: "Synthetic Applications of Acetals to the Acridizinium Series"

Russell Jay Parkinson, B.A., University of Washington; M.A., Duke University
(History) Dissertation: "Politics, Patents and Planes: Military Aeronautics in the United States 1863-1907"

Paul Blair Parks III, B.S., Duke University
(Physics) Dissertation: "Properties of (p,n) Reactions in Tenuous Gases"

Philip L. Peterson, A.B., College of William and Mary
(Philosophy) Dissertation: "A Property Instance Theory of Particulars"

Syed Matiur Rahman, B.A., M.A., Patna University
(Psychology) Dissertation: "Attractiveness of Goal Objects as a Function of Dissonance Reduction"

Horace Darr Rawls, M.S., North Carolina State College
(Sociology) Dissertation: "Education and Social Participation A Factorial Analysis"

Bruce Roger Roberts, B.A., Gettysburg College; M.F., Duke University
(Forestry) Dissertation: "Effects of Water Stress on the Translocation of Photosynthetically Assimilated Carbon-14 in Yellow-Poplar"

Robert Sidwar Robins, A.B., University of Pittsburgh
(Political Science) Dissertation: "Rural Self-Government in Uttar Pradesh, India"

William Woody Rolland, A.B., King College
(Physics) Dissertation: "A Study of the $N^{14}$ (D, n) $O^{15}$ Reaction"

George Morris Rosenstein, A.B., Oberlin College
(Mathematics) Dissertation: "Generalizations and an Extension of Lebesque's Covering Theorem"

John Nelson Russell Score II, B.A., Southwestern University; B.D., Garrett Biblical Institute
(Religion) Dissertation: "A Study of the Concept of the Ministry in the Thought of John Wesley"

David Scott, B.S., M.S., University of Otago
(Botany) Dissertation: "The Standing Crop and Productivity of Alpine Tundra in Relation to Environmental Factors"

John Nelson Shaw, A.B., University of Oregon
(Chemistry) Dissertation: "Monte Carlo Calculations for a System of Hard-Sphere Ions"

William O. Shropshire, A.B., Washington and Lee University
(Economics) Dissertation: "Interest Rate Changes and Capital Outlay Decisions of North Carolina Municipalities, 1955-1958"

William James Smith, A.B., Duke University; M.S., University of Denver
(Biochemistry) Dissertation: "Studies on Dopamine-B-Hydroxylase"

Clarence Nathan Stone, A.B., University of South Carolina
(Political Science) Dissertation: "The City Manager and Community Power: Leadership and Policy Making in a Council-Manager City"

John Richard Thompson, A.B., Albion College
(Zoology) Dissertation: "The Bathyalbenthic Caridean Shrimps of the Southwestern North Atlantic"

A. L. Thomson, B.Sc., University of St. Andrews
(Physics) Dissertation: "Nuclear Magnetic Susceptibility of Liquid and Solid Helium Three"

Barbara Beavers Turner, A.B., Duke University
(Psychology) Dissertation: "The Effects of a Ready Signal Upon Eyelid Conditioning"

W. P. N. Tyler, B.A., Auckland University
(History) Dissertation: "Sir Frederic Rogers, Permanent Under-Secretary at the Colonial Office, 1860-1871"

John D. Utley, B.S., University of Chicago
(Physiology) Dissertation: "The Effects of Anthranilic Hydroxamic Acid on Rat Behavior and Rat Brain Gamma Aminobutyric Acid, Norepinephrine, and 5-Hydroxytryptophan Concentrations"

Robert G. Van Meter, B.S., Geneva College
(Mathematics) Dissertation: "The Number of Solutions of Certain Systems of Equations in a Finite Field"

Jacobus J. P. van Wyk, B.Sc., M.Sc., University of Potchefstroom
(Botany) Dissertation: "Savannah Communities South of the Pilaansberg Mountains, in the Western Transvaal"

Birdsall S. Viault, B.A., M.A., Adelphi College
(History) Dissertation: "The Peace Issue, 1939-1940"

Richard Henry Wagner, B.A., University of Connecticut; M.A., Duke University
(Botany) Dissertation: "The Ecology of *Uniola Paniculata* L. In the Dune-Strand Habitat of North Carolina"

Benjamin Moseley Waite, B.S., Rollins College
(Biochemistry) Dissertation: "Studies on Acetyl CoA Carboxylase"

Stewart Dean Work, A.B., Oberlin College
(Chemistry) Dissertation: "Acylations and Other Condensations of Dianions of Beta-Diketones, Imides and Amides, Acetylation of 1,3,5-Trike tones by Boron Fluoride"

# *Fellows, Scholars, and Assistants*

| *Name* | *Department* | *Home Address* |
|---|---|---|

## ANGIER DUKE MEMORIAL FELLOW

| | | |
|---|---|---|
| William Jerome Mitchell<br>A.B., Emory University; M.A., Duke University | English | Chattanooga, Tennessee |

## JAMES B. DUKE FELLOWS

| | | |
|---|---|---|
| Richard Gaylon Absher<br>B.S., Oklahoma State University; M.S., University of New Mexico | Electrical Engineering | Miami, Oklahoma |
| Michael Cameron Andrews<br>B.A., Dartmouth College; M.A., Harvard University | English | Edisto Island, South Carolina |
| Thomas Atteridge III<br>B.A., Dartmouth College | English | Costa Mesa, California |
| Robert L. Avinger, Jr.<br>A.B., Davidson College | Economics | Columbia, South Carolina |
| Thomas Galbraith Bastedo<br>B.A., M.A., University of Toronto | Political Science | Toronto, Ontario, Canada |
| Frank Joseph Battaglia<br>B.A., LaSalle College | English | Yeadom, Pennsylvania |
| Leonidas Judd Betts, Jr.<br>A.B., University of North Carolina; M.Ed., Duke | Education | Fuquay Springs, North Carolina |
| John Strickland Boyer<br>B.A., Swarthmore College; M.A., University of Wisconsin | Botany | Snow Hill, Maryland |
| George B. Breckenridge<br>M.A., University of Glasgow | Political Science | Dumbarton, Scotland |
| James Hugh Broussard<br>A.B., Harvard College | History | Houston, Texas |
| David Dwight Burr<br>B.A., Oberlin College; B.D., Union Theological Seminary | Religion | Dalton, Massachusetts |
| Joseph G. Campbell, Jr.<br>B.A., Vanderbilt University; B.D., McCormick Seminary | Religion | Nashville, Tennessee |
| Richard Ian Cashman<br>B.A., Sydney University; M.A., Monash University | History | Waitara, Sydney, Australia |
| Bradley Burton Cox<br>B.S., University of Kentucky | Physics | Lancaster, Kentucky |
| Richard Allen Cox<br>B.A., University of Texas; B.S., Lamar State College | English | Beaumont, Texas |
| Charles H. Dickens<br>B.S., Duke University | Education | Thomasville, North Carolina |
| Joann Wallace Gillespie<br>A.B., University of North Carolina | Sociology | Durham, North Carolina |
| Patrick Joseph Gormely<br>A.B., Catholic University | Economics | Victoria, Texas |
| Jack L. Granatstein<br>B.A., Royal Military College; M.A., University of Toronto | History | Barrie, Ontario, Canada |
| Kenneth Gerald Hampton<br>B.S., Wake Forest College | Chemistry | Winston-Salem, North Carolina |
| Kenneth W. D. Kernaghan<br>B.A., McMaster University | Political Science | Hamilton, Ontario, Canada |
| Larry James Kirkpatrick<br>B.A., University of California; M.A., Brown University | English | Colton, California |
| Alan Forrest Lunn<br>B.A., University of British Columbia | Philosophy | N. Vancouver, B.C. |
| Eric Jon Olson<br>B.A., Rice University | Economics | Amarillo, Texas |
| Edward Barry Rich<br>B.A., Brooklyn College | Psychology | Spring Valley, New York |
| James Engel Rocks<br>A.B., Western Reserve University | English | Rocky River, Ohio |
| Constance May Roschke<br>B.A., Newcomb College | Political Science | Kansas City, Missouri |
| Robert Harold Roth<br>A.B., Purdue University | Sociology | Hagerstown, Indiana |
| Robert Paul Schultz<br>B.S., Michigan State University; M.S., Oregon State University | Forestry | L'Anse, Michigan |
| John Evan Simpson<br>A.B., Amherst College | Philosophy | Sacramento, California |
| James Donald Stanfiel<br>B.A., Furman University | Psychology | Greenville, South Carolina |

| *Name* | *Department* | *Home Address* |
|---|---|---|
| **James Lawton Stokesbury**<br>B.A., Acadia University; M.A., University of Western Ontario | History | West Brook, Nova Scotia |
| **Frank Canon Williams**<br>B.E.E. Georgia Institute of Technology; B.D., Southwestern Baptist Theological Seminary | Philosophy | Jackson, Mississippi |
| **John K. Yost**<br>B.A., Washington State University; B.D., Harvard University | History | Pullman, Washington |

## OTTIS GREEN FELLOW

| | | |
|---|---|---|
| **Joseph Zikmund II**<br>B.A., Beloit College; M.A., University of Wisconsin | Political Science | Mt. Prospect, Illinois |

## GURNEY HARRIS KEARNS FELLOWS IN RELIGION

| | | |
|---|---|---|
| **Hugh Lawrence Bond**<br>A.B., Lambuth College; B.D., Duke University | Religion | Memphis, Tennessee |
| **Robert David Kaylor**<br>A.B., Southwestern at Memphis; B.D., Louisville Presbyterian Seminary | Religion | Montevallo, Alabama |
| **Thomas Wheeler Nuckols**<br>B.A., Tulane University; B.D., Southern Baptist Theological Seminary | Religion | Burleson, Texas |

## COMMONWEALTH-CENTER FELLOWS

| | | |
|---|---|---|
| **William James Breen**<br>B.A., University of Melbourne | History | Melbourne, Australia |
| **Richard Edward Hamilton**<br>B.A., University of Toronto | Economics | Oakville, Ontario |
| **John Peter Meekison**<br>B.A.Sc., B.A., University of British Columbia; M.A., University of Western Ontario | Political Science | Vancouver, B. C. |
| **Robert Follet Neill**<br>B.A., M.A., University of Toronto; S.T.B., University of St. Michael's | Economics | Saskatoon, Saskatchewan |
| **Robert Shane Ryland**<br>B.A., M.A., University of British Columbia | History | Royston, B. C. |
| **David Edward Smith**<br>B.A., University of Western Ontario; M.A., Duke University | Political Science | Aylmer West, Ontario |
| **Antony Wood**<br>B.A., University of Canterbury | History | Christchurch, New Zealand |

## WOODROW WILSON FELLOWS

| | | |
|---|---|---|
| **Martha Sue Berry**<br>B.A., Tulane University | Political Science | Brookings, South Dakota |
| **James William Evers**<br>A.B., Memphis State College | English | Rector, Arkansas |
| **Jonathan David Fraley**<br>A.B., University of North Carolina | History | Lenoir, North Carolina |
| **Janet Suzanne Hankins**<br>A.B., Stetson University | English | Miami, Florida |
| **Paul Fenlon Hughes**<br>B.A., Lamar State College | English | Brownsville, Pennsylvania |
| **Alan Albert Jabbour**<br>A.B., University of Miami | English | Jacksonville, Florida |
| **Philip Dwight Jones**<br>A.B., University of Cincinnati | History | Wayne, West Virginia |
| **Jerry Bryan Lincecum**<br>A.B., A & M College of Texas | English | Thornton, Texas |
| **Marie D. Moore**<br>B.A., Woman's College of the University of North Carolina | History | Islamorada, Florida |
| **Ronald Roy Nelson**<br>B.A., State University of South Dakota | History | Sioux Falls, South Dakota |
| **Richard John Neubauer**<br>B.A., Louisiana State University | English | Willowick, Ohio |
| **Ann Fiser Peterson**<br>A.B., Memphis State University | English | Memphis, Tennessee |
| **John Louis Pierce**<br>B.A., University of Tennessee | Political Science | Knoxville, Tennessee |
| **Jay Thomas Roe**<br>A.B., University of Texas | History | Corsicana, Texas |
| **James Alexander Vaughan, Jr.**<br>B.A., Sewanee University of the South | English | Columbia, South Carolina |
| **Margaret Alice Weatherly**<br>B.A., Florida State University | English | Havana, Florida |
| **Rebecca A. White**<br>A.B., Auburn University | English | Hartselle, Alabama |

## DUKE WOODROW WILSON FELLOWS

| | | |
|---|---|---|
| **Daniel C. Arichea, Jr.**<br>B.Th., Theological Seminary; B.A., Philippine Christian College; M.R.E., Duke University | Religion | Zambales, Philippines |
| **Bernard F. Oppel**<br>B.A., Lehigh University | History | E. Stroudsburg, Pennsylvania |

| *Name* | *Department* | *Home Address* |
|---|---|---|

## WOODROW WILSON DISSERTATION YEAR FELLOW

| | | |
|---|---|---|
| John E. Woodham<br>A.B., Birmingham-Southern College | History | Geneva, Alabama |

## COKESBURY AWARDS IN COLLEGE TEACHING

| | | |
|---|---|---|
| William E. King<br>A.B., Duke University | History | Statesville, North Carolina |
| Amos Lee Laine<br>B.A., Randolph-Macon College | History | Hampton, Virginia |

## NATIONAL SCIENCE FOUNDATION COOPERATIVE FELLOWS

| | | |
|---|---|---|
| David L. Pancoast<br>A.B., High Point College | Psychology | High Point, North Carolina |
| John T. Reynolds<br>B.A., Rice Institute | Physics | Lufkin, Texas |
| James R. Sawers, Jr.<br>B.S., Duke University | Physics | Needham, Massachusetts |
| William C. Ward, Jr.<br>A.B., Johns Hopkins University | Psychology | Baltimore, Maryland |
| Bruce R. Wenner<br>B.A., College of Wooster | Mathematics | Canton, Ohio |

## N.S.F. GRADUATE FELLOWS

| | | |
|---|---|---|
| William A. Calder, Jr.<br>B.S., University of Georgia; M.S., Washington State University | Zoology | Decatur, Georgia |
| James Lawrence Cole<br>A.B., Oberlin College; M.A., Princeton University | Psychology | Raleigh, North Carolina |
| James Richard Coleman<br>B.S., St. Peters College; M.S., New York University | Zoology | New York, New York |
| Constance Malmar Harris<br>B.S., Duke University | Biochemistry | Charleston, West Virginia |
| Robert Lloyd Kendall<br>B.A., Cornell University | Zoology | Rochester, New York |
| Deborah Burnham Printz<br>B.S., Duke University | Zoology | Atlanta, Georgia |
| Fred Howard Rash<br>B.S., Wake Forest College | Chemistry | Lexington, North Carolina |
| Jonathan L. Richardson<br>B.A., Williams College; M.A., University of New Zealand | Zoology | Harwich Port, Massachusetts |
| Charles Lowe Rogers<br>B.S., M.S., Auburn University | Electrical Engineering | Birmingham, Alabama |

## N.S.F. SUMMER TEACHING ASSISTANTS

| | | |
|---|---|---|
| Paul Wheeler Kirk<br>B.S., M.S., University of Richmond | Botany | Richmond, Virginia |
| Richard Wesley Rhoades<br>B.S., M.S., University of New Hampshire | Botany | Port Washington, New York |

## LILLY FOUNDATION FELLOWS AND SCHOLARS

| | | |
|---|---|---|
| Peter Nelson Crossland<br>B.A., M.A., Miami University; B.D., Yale University | Political Science | Zanesville, Ohio |
| Kenneth Morton Reshaur<br>B.A., University of Manitoba | Political Science | Gladstone, Manitoba |
| John L. Washburn II<br>A.B., Park College | Political Science | Versailles, Missouri |
| George Robert Wills<br>B.A., Duke University | Political Science | Balboa, Canal Zone |

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FELLOWS

| | | |
|---|---|---|
| Martyn Mathews Caldwell<br>B.S., Colorado State University | Botany | Denver, Colorado |
| Suzanne B. Collings<br>B.S., University of Tennessee | Zoology | Knoxville, Tennessee |
| Wallace Edward Garthright, Jr.<br>B.A., University of Richmond | Mathematics | Cherry Hill, New Jersey |
| Richard Wayne Godwin<br>B.S., Rensselaer Polytechnic Institute | Chemistry | New Orleans, Louisiana |
| Harold Edmund Hackett<br>B.S., M.S., University of Miami | Botany | Portland, Maine |
| Angel G. Hermida<br>B.S., University of Notre Dame | Physics | Mayaguez, Puerto Rico |
| Edward M. Hogan<br>B.A., Cornell University | Physics | Arlington, Virginia |

| *Name* | *Department* | *Home Address* |
|---|---|---|
| John Oscar Kiltinen<br>B.A., Northern Michigan University | Mathematics | Marquette, Michigan |
| Wayne Lee Mattice<br>B.A., Grinnell College | Biochemistry | Sioux Falls, South Dakota |
| Thomas McMahon Spight<br>B.S., University of Redlands | Zoology | Reedley, California |

## NATIONAL DEFENSE ACT FELLOWS

| | | |
|---|---|---|
| Gene Anne Allred<br>B.A., Mary Baldwin College | Philosophy | Fort Smith, Arkansas |
| John Wayne Battle<br>A.B., University of Chattanooga | Romance Languages | Signal Mount, Tennessee |
| Brian Layton Blakeley<br>B.S., Wisconsin State College | History | Eau Claire, Wisconsin |
| Thomas Earl Borcherding<br>A.B., University of Cincinnati | Economics | Cincinnati, Ohio |
| Richard Bourne<br>A.B., Tufts College | Sociology | Brighton, Massachusetts |
| Robert Jasper Cain<br>A.B., Wake Forest College | History | Clinton, North Carolina |
| Fred Davis Chappell<br>B.A., Duke University | English | Candler, North Carolina |
| Carl Norris Edwards<br>A.B., Duke University; B.D., Union Theological Seminary | Religion | Asheville, North Carolina |
| Richard Foster Glenn<br>B.A., Hampden-Sydney College | Romance Languages | Prospect, Virginia |
| Frederick O. Goddard<br>B.A., University of Florida | Economics | Gainesville, Florida |
| Roy Neil Graves II<br>A.B., Princeton University | English | Medina, Tennessee |
| Thomas Joseph Grilliot<br>B.S., University of Dayton | Mathematics | Dayton, Ohio |
| Jerry Allen Herndon<br>B.S., Murray State College | English | Cadiz, Kentucky |
| George Stewart Jackel<br>B.Sc., Drexel Institute of Technology | Physics | Philadelphia, Pennsylvania |
| Raymond Louis Jensen<br>B.A., Bemidji State College | History | Perham, Minnesota |
| Richard W. O. Lethander<br>B.A., Carleton College | Economics | Park Ridge, Illinois |
| G. Douglass Lewis<br>B.S., University of Tennessee | Religion | Lexington, Tennessee |
| Peter K. Manning<br>B.A., Willamette University | Sociology | Portland, Oregon |
| Donald Ray McAdams<br>B.A., Columbia Union College | History | Tacoma Park, Maryland |
| James J. McLeskey<br>B.A., Rice University | Chemistry | Vicksburg, Mississippi |
| Bettie Opal Moretz<br>A.B., Lenoir Rhyne College | Sociology | Bradenton, Florida |
| Marion Vernon Morgan<br>B.S., M.S., North Carolina State College | Anatomy | Charlotte, North Carolina |
| Judith L. Morganroth<br>A.B., Barnard College | Romance Languages | Yonkers, New York |
| Paul F. Mulligan<br>A.B., St. Peters College | Economics | Kearny, New Jersey |
| George Allen Neece<br>A.B., Rice University | Chemistry | Durham, North Carolina |
| John Franklin Piper, Jr.<br>A.B., Lafayette College; B.D., Yale University | Religion | Wynnewood, Pennsylvania |
| John Preston Pooler<br>A.B., Brown University | Psychology | Weston, Massachusetts |
| George I. Rand<br>B.A., Trinity College | English | Hicksville, New York |
| Warren John Rose<br>A.B., University of Miami | Sociology | Miami, Florida |
| Ralph Gerald Saylor<br>B.A., Kalamazoo College | Economics | Fort Wayne, Indiana |
| Kenneth Wayne Sebesta<br>B.A., Austin College | Philosophy | Texas City, Texas |
| David Ben Seligman<br>A.B., University of Rochester | Philosophy | Maplewood, New Jersey |
| Harry Charles Sieber<br>B.A., Baylor University | Romance Languages | San Bernardino, California |
| Marvin Snyder<br>B.A., Brooklyn College | Psychology | Brooklyn, New York |
| Bradford B. Spangenberg<br>B.A., Drew University | History | Johnson City, New York |

| *Name* | *Department* | *Home Address* |
|---|---|---|
| Robert M. Terry<br>B.A., Randolph-Macon College | Romance Languages | South Boston, Virginia |
| Richard S. Thomason<br>B.S., Louisiana State University | Physics | New Orleans, Louisiana |
| John Murray Vines<br>B.A., City College of New York | Romance Languages | Staten Island, New York |
| Clark Woody White<br>S.B., Massachusetts Institute of Technology | Physics | Decatur, Georgia |
| James Burton Wilkinson<br>A.B., Davidson College | Mathematics | Sharon, South Carolina |
| Robert M. Young<br>A.B., Maryville College; M.A., Emory University | Economics | Decatur, Georgia |

## BUREAU OF COMMERCIAL FISHERIES FELLOWS

| | | |
|---|---|---|
| William Edward Carr<br>B.S., Stetson University | Zoology | N. Smyrna Beach, Florida |
| Thomas D. Myers<br>A.B., Bridgewater College | Zoology | Avondale, Pennsylvania |

## DISTINGUISHED TEACHING FELLOWS

| | | |
|---|---|---|
| Robert A. Hohner<br>A.B., Duke University | History | Atlanta, Georgia |
| Jon Nelson Moline<br>A.B., Austin College | Philosophy | Denton, Texas |
| David Eugene Whisnant<br>B.S., Georgia Institute of Technology; A.M., Duke University | English | Atlanta, Georgia |

## DANFORTH GRADUATE FELLOWS

| | | |
|---|---|---|
| Ausonio Marras<br>A.B., Colgate University | Philosophy | Ushers, New York |

## UNIVERSITY FELLOWS

| | | |
|---|---|---|
| Julia Mary G. Biehn<br>A.B., Mt. Holyoke College | Economics | Hicksville, New York |
| William P. Brandon, Jr.<br>B.A., Johns Hopkins University | Political Science | Hickory, North Carolina |
| Frederick Joseph Breit<br>B.A., Roosevelt University | History | Chicago, Illinois |
| Alan Vance Briceland<br>A.B., William & Mary College | History | Towson, Maryland |
| Keith Winston Butler<br>B.S., Ontario Agricultural College | Physiology | Ontario, Canada |
| George H. Cassar<br>B.A., M.A., University of New Brunswick | History | Quebec, Canada |
| Limin Chu<br>A.B., National Central University; A.M., Duke University | English | Taiwan, China |
| Anthony Frank Cilluffo<br>A.B., Harpur College | Psychology | Brooklyn, New York |
| Ghazi Douwaji | Economics | Damascus, Syria |
| Frederick J. Fletcher<br>B.A., University of British Columbia | Political Science | Vancouver, Canada |
| Donald Ganchrow<br>B.S., M.A., Brooklyn College | Psychology | Brooklyn, New York |
| Rodney A. Grunes<br>A.B., Drew University | Political Science | Bay Shore, New York |
| Richard Edward Hamilton<br>B.S., Duke University | Electrical Engineering | Hendersonville, North Carolina |
| Charles E. Henderson<br>B.A., Memphis State University | History | W. Memphis, Arkansas |
| Audley Eugene Hileman<br>B.S., Penn State University; M.S., North Carolina State College | Economics | Raleigh, North Carolina |
| Morris K. Holland<br>B.A., University of Colorado | Psychology | Boulder, Colorado |
| William Barney Huntley, Jr.<br>A.B., Duke University; B.D., Yale University | Religion | Charlotte, North Carolina |
| John D. Kirkland, Jr.<br>A.B., King College | History | Kosciusko, Mississippi |
| John W. Locke<br>B.A., University of Toronto; B.D., College of Bible | Religion | Ontario, Canada |
| C. A. Knox Lovell<br>A.B., William & Mary College | Economics | Springfield, Vermont |
| Gary L. Maris<br>A.B., Stetson University | Political Science | Melbourne, Florida |
| John P. Meekison<br>B.A.Sc., B.A., University of British Columbia; M.A., University of Western Ontario | Political Science | Vancouver, Canada |
| Larry W. Moreland<br>B.A., Southern Methodist University | Political Science | Emporia, Kansas |

| *Name* | *Department* | *Home Address* |
|---|---|---|
| **Bernard A. Morin**<br>B.S., Holy Cross College; M.B.A., Harvard University | Economics | Peabody, Massachusetts |
| **Charles Eric Mount, Jr.**<br>B.A., Southwestern at Memphis; B.D., Union Theological Seminary; S.T.M., Yale University | Religion | Cape Girardeau, Missouri |
| **Evelyn Frances Murphy**<br>A.B., Duke University; M.A., Columbia University | Economics | Arlington, Virginia |
| **Robert Follett Neill**<br>B.A., M.A., University of Toronto; S.T.B., University of St. Michael | Economics | Saskatchewan, Canada |
| **Thomas W. Nuckols**<br>B.A., Tulane University; B.D., Southern Baptist Theological Seminary | Religion | Burleson, Texas |
| **Charles Stanley Rooks**<br>B.A., Wake Forest College | Political Science | Whiteville, North Carolina |
| **Gilbert Lionel Rutman**<br>A.B., M.A., Boston University | Economics | Dorchester, Massachusetts |
| **Robert Shane Ryland**<br>B.A., M.A., University of British Columbia | History | Royston, B. C. |
| **Georgia Brooke Staffend**<br>B.A., Hiram College | German | Garden City, New York |
| **Lloyd Kenneth Stires**<br>B.A., Drew University | Psychology | Franklin Lakes, New Jersey |
| **Robert Clifford Williams**<br>B.A., Austin College | History | Fort Worth, Texas |
| **Antony Wood**<br>B.A., University of Canterbury | History | Christchurch, New Zealand |

## SUMMER SCHOLARS

| | | |
|---|---|---|
| **Christa Altenstetter**<br>A.B., Holderlin Gymnasium | Political Science | Heidelberg, Germany |
| **Hugh Lawrence Bond**<br>A.B., Lambuth College; B.D., Duke University | Religion | Memphis, Tennessee |
| **Thomas Earl Borcherding**<br>A.B., University of Cincinnati | Economics | Cincinnati, Ohio |
| **Rupert A. Buchanan**<br>B.A., Bishops University; LL.B., University of British Columbia | Philosophy | Ontario, Canada |
| **Jane Elliott Chaney**<br>A.B., Duke University | Religion | Rock Hill, South Carolina |
| **Bruce Lynn Clayton**<br>B.A., University of Kansas City | History | Kansas City, Missouri |
| **Donald E. Coe**<br>B.A., Willamette University | Philosophy | Salem, Oregon |
| **Richard E. Gift**<br>B.A., Vanderbilt University; M.A., Emory University | Economics | Davidson, North Carolina |
| **E. Bryan Gillespie**<br>B.A., Wake Forest College; M.A., Duke University | English | Durham, North Carolina |
| **Dallas Milton High**<br>A.B., Ohio Wesleyan University; B.D., Yale University | Religion | Ohio City, Ohio |
| **John Lowell Hill**<br>B.A., Oklahoma Baptist University | History | Richmond, Virginia |
| **John P. Jones**<br>B.A., University of South Dakota; A.M., University of Notre Dame | Political Science | Milwaukee, Wisconsin |
| **Richard Kelly**<br>B.A., City College of New York | English | Woodside, New York |
| **John D. Kirkland, Jr.**<br>A.B., King College | History | Kosciusko, Mississippi |
| **Richard M. Macht**<br>B.A., Dartmouth College | German | Mystic, Connecticut |
| **George E. McCelvey III**<br>B.A., Rice Institute; M.A., University of Houston | English | Houston, Texas |
| **Robert H. McFadden**<br>B.A., Park College | Political Science | Washington, D. C. |
| **John R. Moroney, Jr.**<br>A.B., Southern Methodist University | Economics | New Orleans, Louisiana |
| **Roshni B. Rustomji**<br>B.A., American University of Beirut | English | Karachi, Pakistan |
| **Richard H. Schramm**<br>B.Sc., Capital University; M.A., Ohio University | English | Athens, Ohio |
| **Norma Upchurch**<br>B.A., Wake Forest College; M.A., Emory University | Romance Languages | Yanceyville, North Carolina |
| **Thomas A. Van**<br>B.A., City College of New York | English | New York, New York |
| **Robert D. Vance**<br>B.A., Kenyon College | Philosophy | Dayton, Ohio |
| **George K. Walker**<br>B.A., University of Alabama | History | Tuscaloosa, Alabama |
| **John C. White**<br>A.B., Washington and Lee University; M.A., Duke University | History | Arlington, Virginia |
| **Eldon G. Woodcock**<br>B.A., Swarthmore College; Th.M., Dallas Theological Seminary | Religion | Rosemont, Pennsylvania |

| *Name* | *Department* | *Home Address* |
|---|---|---|
| **TRAVEL AWARDS** | | |
| **Monique Bras**<br>A.B., E.N.C. Paris | Romance Languages | Montrouge, France |
| **Craven Allen Burris**<br>A.A., Wingate College; B.S., Wake Forest College; B.D., Southeastern Baptist Seminary | History | Wingate, North Carolina |
| **John J. Dunn**<br>B.A., Harvard College | English | Savannah, Georgia |
| **James M. Kuist**<br>A.B., Davidson College; M.A., Duke University | English | Princeton, New Jersey |
| **Bradford B. Spangenberg**<br>B.A., Drew University | History | Johnson City, New York |
| **Lawrence Howard Suid**<br>B.A., Western Reserve University | History | Hollywood, Florida |
| **Idris Rhea Traylor, Jr.**<br>B.A., M.A., University of Texas | History | Lubbock, Texas |
| **GRADUATE SCHOLARS** | | |
| **Christa Altenstetter**<br>A.B., Holderlin Gymnasium | Political Science | Heidelberg, Germany |
| **Richard Lee Anthony**<br>B.A., University of Michigan | Psychology | Flushing, Michigan |
| **Patricia Claire Bailey**<br>B.A., Midwestern University | Political Science | Sheppard A.F.B., Texas |
| **Michael Edward Bassett**<br>B.A., M.A., Auckland University | History | Auckland, New Zealand |
| **Ona Marguerite Bearden**<br>A.B., Stetson University | Sociology | Atlanta, Georgia |
| **William James Breen**<br>B.A., University of Melbourne | History | Melbourne, Australia |
| **Craven Allen Burris**<br>A.A., Wingate College; B.S., Wake Forest College; B.D., Southeastern Baptist Seminary | History | Wingate, North Carolina |
| **James Edwin Byer**<br>B.S., University of Chicago | English | Knoxville, Tennessee |
| **A. Ralph Cavaliere**<br>B.S., M.S., Arizona State University | Botany | New Haven, Connecticut |
| **Carolyn L. Christiansen**<br>B.A., Drake University | Political Science | Avoca, Iowa |
| **Charles A. Church, Jr.**<br>B.S., M.S., Virginia Polytechnic Institute | Mathematics | Winston-Salem, North Carolina |
| **Stanley Gordon Clarke**<br>B.A., University of Saskatchewan | Philosophy | Regina, Saskatchewan, Canada |
| **Donald Edward Coe**<br>B.A., Willamette University | Philosophy | Salem, Oregon |
| **Arnold Cooper**<br>B.S., West Chester State College | History | Philadelphia, Pennsylvania |
| **Ronald Cooper Crossley**<br>B.A., Howard College; B.D., Southern Baptist Seminary | Religion | Anniston, Alabama |
| **John Goodwin Dennis**<br>A.B., Dartmouth University | Botany | Falls Church, Virginia |
| **C. Earl Edmondson**<br>B.A., Mississippi College | History | Edwards, Mississippi |
| **James A. Farrar**<br>B.A., B.D., Texas Christian University; S.T.M., Yale University | Religion | Fort Worth, Texas |
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# ENGINEERING

THE UNDERGRADUATE COLLEGE
THE GRADUATE PROGRAM

ANNOUNCEMENTS FOR 1964-1965

DURHAM, NORTH CAROLINA
February 1964

# Calendar of the College

1964

| | | |
|---|---|---|
| September | 17. | Thursday, 7:30 p.m. Orientation begins: Assemblies for all new students entering the College of Engineering, Trinity College, and the Woman's College. |
| September | 21. | Monday. Registration and matriculation of all students of the College of Engineering, Trinity College, and the Woman's College who have not pre-registered. Registration of graduate students. |
| September | 23. | Wednesday. Final registration of pre-registered students. |
| September | 24. | Thursday, 8:10 a.m. Fall semester classes begin. |
| November | 7. | Saturday. Last day for reporting six-week grades. |
| November | 25. | Wednesday, 12:30 p.m. Thanksgiving recess begins. |
| November | 30. | Monday, 8:10 a.m. Classes are resumed. |
| December | 11. | Friday. Founders' Day. |
| December | 19. | Saturday, 12:30 p.m. Christmas recess begins. |

1965

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| January | 4. | Monday. 8:10 a.m. Classes are resumed. |
| January | 16. | Saturday, 12:30 p.m. Fall semester classes end. |
| January | 19. | Tuesday. Final examinations begin. |
| January | 29. | Friday. Final examinations end. |
| February | 2. | Tuesday. Registration and matriculation of new undergraduate students. |
| February | 3. | Wednesday. Last day for matriculation for the spring semester. Registration of graduate students. |
| February | 4. | Thursday, 8:10 a.m. Spring semester classes begin. |
| March | 17. | Wednesday. Last day for reporting six-week grades. |
| March | 27. | Saturday, 12:30 p.m. Spring recess begins. |
| April | 5. | Monday, 8:10 a.m. Classes are resumed. |
| May | 20. | Thursday, 5:00 p.m. Spring semester classes end. |
| May | 22. | Saturday. Final examinations begin. |
| June | 2. | Wednesday. Final examinations end. |
| June | 5. | Saturday. Commencement begins. |
| June | 6. | Sunday. Commencement Sermon. |
| June | 7. | Monday. Graduation Exercises. |

For complete calendar of THE GRADUATE SCHOOL, refer to *Bulletin of the Graduate School of Arts and Sciences.*

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# Officers of the College

## *General University Administration*

Douglas Maitland Knight, Ph.D., *President of the University*

Gerhard Chester Henricksen, M.A., C.P.A., *Vice President for Business and Finance, Treasurer*

Everett Harold Hopkins, Ph.D., *Vice President for Planning and Institutional Studies, Assistant Provost*

Frank Leon Ashmore, A.B., *Vice President for Institutional Advancement, Assistant Provost*

Charles Edward Jordan, A.B., LL.D., *Vice President for University Relations*

Herbert James Herring, M.A., LL.D., *Vice President for Student Life*

Frank Traver de Vyver, Ph.D., *Vice Provost*

Harold Walter Lewis, Ph.D., *Dean of Arts and Sciences, Vice Provost*

Maurice Barnes Woodhall, M.D., *Dean of the Medical School, Vice Provost*

Benjamin Edward Powell, Ph.D., *Librarian*

Richard Lovejoy Tuthill, Ed.D., *University Registrar*

Craufurd David Goodwin, Ph.D., *Secretary*

Edwin Constant Bryson, LL.B., *University Counsel*

## *Engineering Administration*

James Lathrop Meriam, Ph.D., *Dean and Director of Research and Development*

Charles Rowe Vail, Ph.D., *Associate Dean for Graduate Study and Research*

Edward Kready Kraybill, M.S.E., *Assistant Dean of Engineering*

Richard Lionel Predmore, D.M.L., *Dean of The Graduate School of Arts and Sciences*

Robert B. Cox, A.M., *Dean of Undergraduate Men*

Everett Broadus Weatherspoon, A.B., *Director of Admissions, College of Engineering and Trinity College*

Earl Ivan Brown, II, Ph.D., *Chairman and Director of Undergraduate and Graduate Studies, Department of Civil Engineering*

Thomas George Wilson, Sc.D., *Chairman, Department of Electrical Engineering*

Otto Meier, Jr., Ph.D., *Director of Undergraduate Studies, Department of Electrical Engineering*

Harry Ashton Owen, Jr., Ph.D., *Director of Graduate Studies, Department of Electrical Engineering*

John Nelson Macduff, M.M.E., *Chairman and Director of Undergraduate and Graduate Studies, Department of Mechanical Engineering*

Mrs. Dorothy Holt McElduff, A.B., *Recorder*

## *Faculty Emeritus*

Harold Crusius Bird, Ph.B., C.E., *Professor Emeritus of Civil Engineering*

William Holland Hall, A.M., M.S.C.E., *J. A. Jones Professor Emeritus of Engineering*

Ralph Sydney Wilbur, M.E., *Professor Emeritus of Mechanical Engineering*

Frank Nicholas Egerton, A.M., E.E., *Associate Professor Emeritus of Electrical Engineering*

# Engineering Programs

ENGINEERING is the profession in which a knowledge of the mathematical and natural sciences gained by study and experience is applied to develop ways of utilizing economically the materials and forces of nature for the well-being of mankind. The programs of engineering education and research at Duke University are designed to provide the opportunity for students to prepare for successful practice of that profession and for a satisfying and responsible citizenship.

The College of Engineering and the Graduate School of Arts and Sciences are the vehicles for accomplishing this goal.

Through its component Departments of Civil, Electrical, and Mechanical Engineering, the College of Engineering offers fully accredited programs leading to the degree of Bachelor of Science in Civil, Electrical, or Mechanical Engineering. Through the Graduate School of Arts and Sciences, work is offered leading to the degree of Master of Science in civil, electrical, or mechanical engineering, and to the Doctor of Philosophy degree with a major in electrical engineering.

## *History*

The College of Engineering traces its origin to 1887, when instruction in engineering subjects was begun by Trinity College. With the establishment of Duke University the program in engineering rapidly evolved to its present status through a series of steps that included the formation of separate departments in civil and electrical engineering in 1927, the formation of a separate department in mechanical engineering in 1931, the establishment of the Division of Engineering, with the three departments as components, in 1937, and, finally, the incorporation of this Division into the University structure in 1939 as the College of Engineering, one of the three coordinate undergraduate colleges of Duke University. The Master of Science degree with a major in engineering was authorized in 1956 and the Doctor of Philosophy in electrical engineering was authorized in 1960, both through the Graduate School of Arts and Sciences.

## *Relationship to the University*

As part of the University community, students in the engineering programs share in a total educational experience that only a major university can provide. The College of Engineering shares the same

campus with Trinity College, the Graduate School of Arts and Sciences, the Divinity School, and the Schools of Forestry, Law, Medicine, and Nursing. The facilities for library, laboratory, and field work and the many activities—religious, intellectual, cultural, pre-professional, social, and athletic—form a major part of the environment of the engineering student. He may enjoy simultaneously the broad facilities and challenges of a university and the life and atmosphere of a small college.

## *Undergraduate Program*

The aim of undergraduate engineering education at Duke is to provide an atmosphere in which the student will be motivated to acquire knowledge and understanding in various areas of human endeavor and to equip him for an effective and satisfying career in his chosen profession. The program stresses the development of intellectual power and seeks to provide a broad scientific base for later technical studies as well as to stimulate an interest in the humanities and the social studies. Both on the campus and in the classroom the emphasis is on the individual. To this end classes are kept small and close contact is maintained between professor and student.

Each of the three undergraduate engineering curricula requires a minimum of 142 semester hours of work for the bachelor's degree.

Detailed information for prospective students can be found in the bulletin *Information for Prospective Students,* which is available through the Registrar, Duke University, Durham, North Carolina—27706.

## *Liberal Arts - Engineering Combined Program*

Under a special plan of cooperation with selected liberal arts colleges, the College of Engineering makes it possible for students to combine with their professional engineering training an enlarged program of humanities and social studies. Under this "three-two" plan an outstanding student may follow an approved program of study at the cooperating liberal arts college for an initial period of three years and then complete his studies in the College of Engineering at Duke University in two more years. Upon completion of the combined program of five years, the Bachelor of Arts degree is granted by the cooperating liberal arts college, and the degree of Bachelor of Science in Civil, Electrical, or Mechanical Engineering is granted by Duke University. Currently associated with the Duke University College of Engineering in this plan are: American University, Washington, D. C.; Davidson College, Davidson, N. C.; Elon College, Elon,

N. C.; Illinois Wesleyan University, Bloomington, Ill.; John B. Stetson University, Deland, Fla.; Methodist College, Fayetteville, N. C.; Middlebury College, Middlebury, Vt.; Wake Forest College, Winston-Salem, N. C.; Wofford College, Spartanburg, S. C.

Inquiries concerning this plan should be addressed to the Dean, College of Engineering, Duke University, Durham, North Carolina—27706.

## *Master of Science Program*

Through the Graduate School of Arts and Sciences, the three departments which constitute the College of Engineering offer work leading to the Master of Science degree with a major in civil, electrical, or mechanical engineering. Each of these programs requires 30 units of graduate work: 24 units of course work and a research-based thesis carrying 6 units of credit. The available areas of specialization in each department are listed elsewhere in the appropriate departmental section of this bulletin.

For further information, write to the chairman of the appropriate engineering department, Duke University, Durham, N. C.—27706.

## *Doctor of Philosophy Program*

The Doctor of Philosophy degree with a major in electrical engineering is offered through the Graduate School of Arts and Sciences. Minimum requirements for this degree include 48 units of graduate course work, a reading knowledge of two foreign languages, and a research-based dissertation. The available areas of specialization are listed in this bulletin in the section on electrical engineering.

For further information, write to the Chairman, Department of Electrical Engineering, Duke University, Durham, North Carolina—27706.

## *Organization*

The affairs of the College of Engineering are administered by the Dean of the College, with the assistance of an Executive Committee which includes the Chairmen of the three Departments of Engineering and the Assistant Dean. The legislative body of the College is the Engineering Faculty Council, which has responsibility for the curriculum and for determining policies in those academic matters that pertain exclusively to the College of Engineering. The affairs of each Department of Engineering are administered by the Chairman of that Department, with the assistance of the Department Faculty.

Much of the administrative work of the College is carried out by committees.

The graduate programs are administered by the respective engineering departments through the Graduate School of Arts and Sciences.

## *Physical Plant*

The College is on the West Campus in a building that was first occupied in January 1948. Each of three wings houses the laboratories and the special classrooms of one of the three engineering departments. The main portion of the building has offices, classrooms, and other general facilities including a library of some 32,000 volumes and 347 periodicals; an auditorium where audio-visual instruction can be given to large groups; conference rooms and seminar rooms; a student lounge; design rooms; and facilities for reproducing copy of various types.

# Admission

## *Undergraduate*

CANDIDATES may qualify for admission to the College of Engineering as members of the freshman class or as students with advanced standing. Since the enrollment is limited, the Committee on Admissions selects students who, in its judgment, are best qualified to benefit from the opportunities which the College offers. Selection is based primarily on the academic record of the candidate, on test scores, and on satisfactory evidence of good character and general fitness for college life at Duke. A personal interview with an officer of the Admissions Office is welcomed, and a visit to the campus is of material benefit to the candidate.

ADMISSION TO THE FRESHMAN CLASS: A candidate for admission to the freshman class must present at least 15 acceptable units of secondary school credit. A minimum of 12 units in college preparatory subjects must be presented, but it is recommended that 15 be offered. Subjects classified as college preparatory are English, foreign languages, history and social studies, mathematics and sciences. Candidates are advised to present four units of mathematics and at least one unit in physics or chemistry.

All candidates for admission to the freshman class are required to take the Scholastic Aptitude Test and three Achievement Tests of the College Entrance Examination Board (CEEB). The Achievement Tests must include the English Composition Test and the appropriate test in Mathematics. Details of the procedure to be followed in complying with this requirement will be sent to each candidate for admission.

ADMISSION PROCEDURE: Application for admission to the College of Engineering should be made to the Office of Admissions, Duke University, Durham, North Carolina—27706. Application forms and instructions will be sent to the candidate. It is the responsibility of the candidate to see that these forms are properly executed and, together with other requested material, sent promptly to the Office of Admissions. A nonrefundable application processing fee of $10.00 must accompany the official application form.

EARLY DECISION PLAN: For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on either October 15 or February 1

of the student's senior year in secondary school. The deadline date for completing applications for October decision is September 15 and for February decision, January 1. Interested students should write to the Office of Admissions for detailed information.

REGULAR ADMISSION: Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina—27706.

ADMISSION TO ADVANCED STANDING: Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class.

Credit for work completed at other institutions will be determined in relation to the curriculum requirements of the College of Engineering, and must be approved by the appropriate Director of Undergraduate Studies and the Dean of Engineering. Prior approval should be obtained before scheduling courses to be taken at other institutions. Courses in which grades of less than C have been earned are not acceptable for transfer credit.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses. Any extension work accepted must be specifically approved by the Dean of the College.

ADVANCED PLACEMENT: The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to sophomore-level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, while the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the deans of the colleges are

charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board.

ADVANCED PLACEMENT COURSE CREDIT: Any student who has earned a score of 3 or higher on an Advanced Placement Examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of 4 or 5 the award of credit will be made automatically upon matriculation; for those presenting scores of 3 it will be determined with the approval of the University department concerned, no earlier than the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program. In the case of E-1 and E-2 for which CEEB tests are not given, credit may be given on the basis of qualifying tests.

ADMISSION OF SPECIAL STUDENTS: Students of mature age may be admitted for special work in such courses of instruction as they are qualified to take. They may not be admitted as candidates for a degree in a regular course unless they meet all normal requirements for admission.

READMISSION OF FORMER STUDENTS: A student who, following withdrawal from the College, desires to return should apply to the Director of Admissions, and send a detailed statement of his activities since leaving Duke University.

SPECIAL ADVISORY PROGRAM: The University is alert to identify the superior student at the beginning of his college career and to encourage him to realize his intellectual potentialities. To this end the College provides certain programs, in addition to advanced placement and advanced placement credit. Although every freshman is included in an advisory program, a special advisory group has been created, to which are invited a number of the entering class. These students are assigned special Faculty Advisors. By individual counseling, some students are assigned to special restricted seminar groups, and some others are urged to undertake (under the guidance of individual faculty members) independent reading and study programs which permit them to omit certain introductory courses and to proceed to more comprehensive courses, upon a demonstration of their readiness.

WOMEN STUDENTS: Women students enrolled in the College of Engineering live on the Woman's College campus and are subject to the general non-academic regulations of the Woman's College.

## *Graduate*

PREREQUISITES: A student seeking admission to the Graduate School of Arts and Sciences of Duke University with a major in engineering must normally have received a Bachelor's degree from an accredited engineering institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study.

STUDENTS REQUIRING ADMISSION: Admission is required of (1) all students who intend to pursue study toward a degree offered by the Graduate School, (2) all other students who desire credit for whatever purpose for graduate courses—except students who register only in the Summer Session. Students who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean of the Graduate School to undertake a doctoral program.

PROCEDURE FOR ALL APPLICANTS: A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should fill out completely and return promptly. In addition he should provide the following supporting documents: (1) a transcript or transcripts of all his undergraduate and graduate work mailed directly by the Registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; (4) scores on the Graduate Record Examinations and Miller Analogies Test.

For complete admission requirements, consult the *Bulletin of the Graduate School of Arts and Sciences,* which may be obtained by writing to the Dean, Graduate School of Arts and Sciences. Duke University, Durham, North Carolina—27706.

# Department of Civil Engineering

*Chairman and Director of Undergraduate and Graduate Studies*
EARL IVAN BROWN, II

*J. A. Jones Professor*
¶EARL IVAN BROWN, II, (1960)
Ph.D. (Texas)

*Professor*
JAMES WESLEY WILLIAMS (1937)
M.S. (Harvard)

*Associate Professors*
¶EDWARD HENRY BRYAN (1960)
Ph.D. (Wisconsin)

SUDHIR KUMAR (1958)
Ph.D. (Pennsylvania State)
*Visiting, Part Time*

¶**WILLIAM HENRY GARDNER, JR., (1953) M. Engr. (Yale)

¶AUBREY EDWIN PALMER (1944)
C.E. (Virginia)

*Assistant Professors*
KIRO PETE ARGES (1953)
M.S. (Tennessee)

†HOWARD N. HAINES (1943)
B.S. in Arch. (Minnesota)

**PAUL HARRAWOOD (1956)
M.S. (Missouri School of Mines & Metallurgy)

DAVID WILLIAM HILL (1962), Assistant Professor of Engineering Mechanics
Ph.D. (Stanford)

***CLYDE NELSON HOLLAND (1957)
M.S. (Duke)

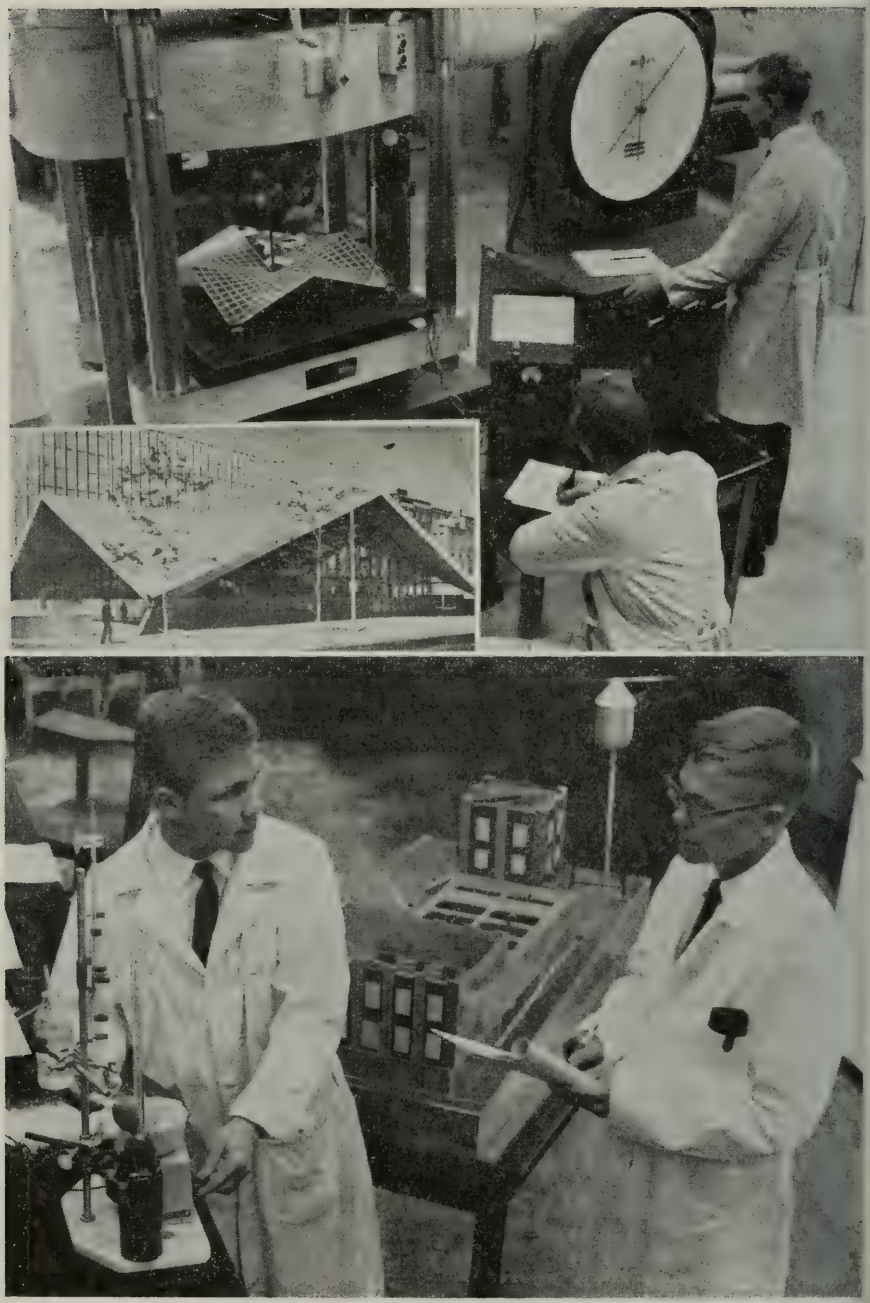
DON JAMES WOOD (1962)
Ph.D. (Carnegie Tech)

*Lecturer*
ALEXANDER WILLIAM MOLINA (1956)
B.S. (Duke)

*Temporary Instructor*
FREDERICK GAYLE SHEPPARD (1962)
B.S. (Duke)

THE work of a civil engineer may be divided into four major fields: sanitary engineering—public health, water supply, and waste disposal; hydraulics—flood control, river improvements, irrigation, drainage, and water power; transportation—railroads, highways, airports, waterways, pipe lines, and traffic control; structures—bridges, buildings, foundations, dams, tunnels, tanks, thin shells, and missile structures; city planning, land use and measurements. The concern of a civil engineer is primarily with conception, design and construction, although often his responsibility includes maintenance. His undergraduate education comprises scientific, technical, civic, and cultural subjects. In order that he may become qualified to assume responsible charge of engineering work, he must supplement this instruction with progressive study after he graduates and while he is securing his practical experience.

¶ Registered Professional Engineer.
† Registered Architect.
* Resigned, August 31, 1963.
** Leave of Absence, Fall Semester, 1963-64.
*** Leave of Absence, Academic Year, 1963-64



The various facilities of the department are described below.

The *Mechanics of Materials Laboratory* is equipped to give instruction in the basic principles of stress and strain and for the testing of structural members. Its facilities are adequate for both graduate and undergraduate instruction. Included in this laboratory are three universal testing machines with capacities from 5,000 to 400,000 pounds; various hardness testers; machines for testing torsion, fatigue, and impact; calibration apparatus; and a variety of modern strain gages of direct acting mechanical and electric-resistance types.

*The Materials Laboratory* has the equipment necessary for both engineering research and undergraduate instruction in the physical properties and stress-deformation characteristics of bituminous mixtures, concretes, and soils.

For advanced instruction in *Stress Analysis* there are various polariscopes with facilities for taking and developing pictures, large-sized Begg's deformeter, loading frames, and miscellaneous tools for preparing accurate models for testing. Modern electrical and mechanical instrumentation is available for strain measurements.

The department has an unusually modern and representative collection of *Surveying Equipment:* transits, levels, plane tables, accessory equipment, precise levels and theodolites.

In the *Sanitary Engineering Laboratory* there is complete equipment for performing the physical, chemical, bacteriological, and microscopic tests as outlined by the American Public Health Association.

For *Digital Computer Programming,* departmental card punch equipment using the ALGOL and FORTRAN languages is available.

# *Program of Studies for the Degree of Bachelor of Science in Civil Engineering*

## §*Freshman Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Engrg | 1 | Engineering Graphics | 2 | Engrg | 2 | Descriptive Geometry | 2 |
| Engl | 1 | English Composition | 3 | Engl | 2 | English Composition | 3 |
| Hist | 1 | Modern History | 3 | Hist | 2 | Modern History | 3 |
| Math | 21 | Introductory Calculus | 3 | †Math | 22 | Introductory Calculus | 3 |
| Phys | 41 | General Physics | 4 | Phys | 42 | General Physics | 4 |
| PE | | Physical Education | 1 | PE | | Physical Education | 1 |
| | | | *16 | | | | *16 |

## *Sophomore Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Chem | 1 | Gen. Inorganic Chemistry | 4 | Chem | 2 | Gen. Inorganic Chemistry | 4 |
| †CE | 61 | Surveying | 5 | CE | 72 | Materials Laboratory I | 1 |
| Engrg | 57 | Statics | 3 | †Engrg | 107 | Mechanics of Materials | 3 |
| Math | 63 | Intermediate Calculus | 3 | Engrg | 109 | Materials Laboratory | 1 |
| ‡Approved Elective | | | 3 | Engl | 93 | Technical Communication | 3 |
| PE | | Physical Education | 1 | Math | 64 | Intermediate Calculus | 3 |
| | | | — | ‡Approved Elective | | | 3 |
| | | | 19 | PE | | Physical Education | 1 |
| | | | | | | | 19 |

## *Junior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 101 | Materials Laboratory II | 1 | CE | 113 | Route Surveying | 2 |
| CE | 118 | Engineering Materials | 2 | CE | 133 | Reinforced Concrete | 3 |
| †CE | 131 | Structural Mechanics I | 3 | EE | 123 | Fundamentals of EE | 3 |
| CE | 135 | Soil Mechanics | 2 | EE | 125 | Elec. Fundamentals Lab. | 1 |
| Engrg | 115 | Dynamics | 3 | †Engrg | 128 | Fluid Mechanics | 3 |
| ME | 103 | Thermodynamics | 3 | ‡Approved Electives | | | 6 |
| ME | 116 | M. E. Laboratory | 1 | | | | 18 |
| ‡Approved Elective | | | 3 | | | | |
| | | | 18 | | | | |

## *Senior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 123 | Hydraulic Engineering | 3 | CE | 116 | Transportation Engrg. | 3 |
| CE | 124 | Sanitary Engineering | 3 | CE | 140 | Structural Mechanics II | 3 |
| CE | 132 | Structural Design | 4 | CE | | Elective | 3 |
| CE | 146 | Professional Engineering | 2 | ‡Approved Electives | | | 9 |
| ‡Approved Electives | | | 6 | | | | 18 |
| | | | 18 | | | | |

† Courses which must be passed before engineering academic standing can be advanced. (See page 53.)

* Freshman engineering students taking Air Science or Naval Science will schedule certain courses in addition to the 16 semester hours prescribed for each semester.

‡ Part of a program of 30 semester hours of electives planned with departmental approval to suit the interests and abilities of each student. The program will include three semester hours of mathematics beyond calculus; an additional nine semester hours in mathematics, the sciences, or other technical subjects; and another 15 semester hours in the humanities or the social sciences, including six semester hours of either economics or political science.

A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

§ There is a single, common program in the Freshman Year; final choice of a department is not made until the time of registration for the sophomore year.

# *Undergraduate Courses*

CE 61. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land surveys; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg. 1 and Math. 21. 5 s.h. SHEPPARD

CE 72. MATERIALS LABORATORY I.—Blending of granular materials and determinations of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. STAFF

CE 101. MATERIALS LABORATORY II.—Testing of soils, concrete, and bituminous mixtures. Mechanical analyses, compaction, consolidation, triaxial, and stability tests. Analysis of test results. Prerequisite: CE 72; concurrent: Engrg. 107. 1 s.h. SHEPPARD

CE S110. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. 3 s.h. ARGES

CE 113. ROUTE SURVEYING.—Simple, compound, and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. WILLIAMS

CE 116. TRANSPORTATION ENGINEERING.—Location, design, construction and maintenance of highways and city streets: soil stabilization; traffic studies; economics of planning and design. Prerequisite: CE 113, 135. 3 s.h. WILLIAMS

CE 118. MATERIALS OF ENGINEERING.—Behavior of materials under load; mechanical properties as criteria for failure; elementary metallurgy. Ferrous and non-ferrous metals and non-metallic materials. Prerequisite: Engrg. 107 and Engrg. 109. 2 s.h. WILLIAMS

CE 121. *HYDROLOGY.—Fundamentals of meteorology; precipitation; exaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg. 128. 3 s.h. WILLIAMS

CE 123. HYDRAULIC ENGINEERING.—Pipe flow, compound pipe systems, network analysis, analysis and problems on pumps and turbines, fundamental aspects of hydrology. Open channel flow, non-uniform flow computations. Irrigation and drainage problems. Flood control and hydraulic structures. Prerequisite: Engrg. 128. 3 s.h. WILLIAMS

CE 124. FUNDAMENTALS OF SANITARY ENGINEERING.—Engineering and public health aspects of water treatment and supply, waste treatment and disposal, and environmental sanitation. Design basis for collection and treatment facilities. Laboratory procedures and interpretation of results. Prerequisite: Chemistry 2; Concurrent: CE 123. 3 s.h. BRYAN

CE 126. *SANITARY ENGINEERING DESIGN.—Design of facilities for providing an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisite: CE 124. 3 s.h. BRYAN

CE 131. STRUCTURAL MECHANICS I.—Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg. 107. 3 s.h. BROWN

CE 132. STRUCTURAL DESIGN.—Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring connectors. Design and detail drawings. Prerequisite: C.E. 131. 4 s.h. PALMER

* Offered only upon sufficient demand; enrollment limited.

CE 133. REINFORCED CONCRETE.—Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. BROWN AND PALMER

CE 135. SOIL MECHANICS.—Soil identification and classification; elementary soil physics; drainage; exploration; stability of footings and retaining walls; settlement; application of theory to foundation design. Prerequisite: Engrg. 107. 2 s.h. STAFF

CE 140. STRUCTURAL MECHANICS II.—Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 131. 3 s.h. HILL

CE 143, 144. *PROJECTS IN CIVIL ENGINEERING.—This course may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case it may be substituted for certain civil engineering courses. 3-6 s.h. STAFF

CE 146. PROFESSIONAL ENGINEERING.—Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Seniors only. 2 s.h. PALMER

CE 148. *STRUCTURAL ENGINEERING.—Structural design utilizing metal, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisite: CE 132 and CE 133. 3 s.h. PALMER

CE 154. *GEOMETRIC THOROUGHFARE DESIGN.—Analysis and design of municipal street systems. Origin-destination surveys; control of traffic flow; grade, rotary, and grade-separation intersections. Prerequisite: CE 113. 3 s.h. WILLIAMS

## *Program of Studies in Civil Engineering for the Degree of Master of Science*

Through the Graduate School of Arts and Sciences, the Department of Civil Engineering offers work leading to the degree of Master of Science. A broad approach is emphasized and fundamental principles are stressed. Narrowly specialized courses are not offered. Each graduate student, therefore, engages in a program that is designed to give him technical competence in the sciences related to his field of study, and to give him an understanding of the art of engineering, which depends on imagination and judgment. A student may specialize in one of the following fields of study: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soils engineering, or structural engineering.

A minimum of 30 units of approved graduate credit is required for the M.S. degree: at least 12 units in a major subject area, 6 units in related minor work outside of engineering, 6 units in either major or minor subject, and 6 units for a research-based thesis in the Department of Civil Engineering. A student majoring in sanitary engineering may include in this related work 3 units in the Department of Sanitary Engineering of the University of North Carolina. The minor

* Offered only upon demand, enrollment limited.

work will normally be taken in the Departments of Mathematics and Chemistry or Physics. A student whose major interests relate to the biological or social sciences may take minor work in these areas. Each graduate student participates in Departmental seminars appropriate to his field of study. There is no language requirement for the M.S. degree.

A Bachelor's degree from an accredited engineering college and study including mechanics of materials, solid and fluid mechanics, and mathematics through linear differential equations are prerequisite for admission to the graduate program.

## *Graduate Courses*

PROFESSOR BROWN, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES; PROFESSOR WILLIAMS; ASSOCIATE PROFESSORS BRYAN AND KUMAR; ASSISTANT PROFESSORS HILL AND WOOD

CE 202. EXPERIMENTAL STRESS ANALYSIS.—The analysis of stress and strain in deformable bodies, correlation of theory with data from experiment. Photoelasticity. Strain gages. Similitude. 3 units. KUMAR

CE 203. ADVANCED MECHANICS OF MATERIALS.—Analysis of structural elements described by ordinary differential equations such as beams on an elastic foundation, circular plates; applications to elementary problems of plates and shells. Introduction to elasticity and plasticity. Energy methods in elasticity. 3 units. HILL

CE 204. THEORY OF PLATES AND SHELLS.—Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 205. THEORY OF ELASTICITY.—Linear theory of elasticity; solutions of two dimensional problems; three dimensional problems of torsion and bending; elastic wave propagation; energy principles. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 211. BEHAVIOR OF MATERIALS.—Macroscopic mechanical properties of materials for static, fatigue, dynamic, and creep conditions; low and high temperature properties; applications. 3 units. KUMAR

CE 231. STRUCTURAL THEORY AND ANALYSIS.—The application of the fundamental theories of structural action to the design and analysis of structural members. Specifications. Planning of CE projects. 3 units. BROWN

CE 232. REINFORCED CONCRETE THEORY.—Design and analysis of reinforced concrete members including plates and shells. Prestressed and poststressed concrete members. 3 units. BROWN

CE 235. FOUNDATION ENGINEERING.—The theory and application of soil mechanics to the design and analysis of foundations, subsurface structures, and earth works. 3 units. STAFF

CE 242. *HYDRAULIC ENGINEERING.—Fundamental principles of flow, effects of gravity, viscosity, compressibility, and surface tension of fluid motion in closed conduits and open channels; surface and form resistance; hydraulic similitude. Fundamentals of applied hydrology. 3 units. WILLIAMS AND WOOD

CE 244. *SANITARY ENGINEERING PROCESSES.—Fundamental bases for design of water and waste treatment systems, including: transport, mixing, sedimentation and filtration; gas transfer, coagulation, and bio-treatment processes. 3 units. BRYAN

* Offered only upon demand, enrollment limited.

CE 250. ENGINEERING ANALYSIS.—General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical techniques; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and non-uniform properties and with rigid and non-rigid supports. 3 units. WOOD

CE 265. ADVANCED TOPICS IN CIVIL ENGINEERING.—Opportunity for study of advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 units.
MEMBERS OF THE GRADUATE STAFF

CE 297-298. THESIS RESEARCH.—A student with the proper background may carry on research under the direction of the staff in one of the following fields: engineering mechanics, foundation engineering; hydraulic engineering; materials science; structural engineering; or sanitary engineering. Thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF

# Department of Electrical Engineering

*Chairman:* Thomas George Wilson
*Director of Undergraduate Studies:* Otto Meier, Jr.
*Director of Graduate Studies:* Harry Ashton Owen, Jr.

*Professors*

Otto Meier, Jr. (1934)
Ph.D. (Pennsylvania)

¶Walter James Seeley (1925)
M.S. (Pennsylvania)

¶Charles Rowe Vail (1939)
Ph.D. (Michigan)

¶Thomas George Wilson (1959)
Sc.D. (Harvard)

*Associate Professors*

John Leslie Artley (1955)
D.Eng. (Johns Hopkins)

Robert Merier Burger (1962), *Adjunct*
Ph.D. (Brown)

¶Wellington Wesley Koepsel (1963)
Ph.D. (Oklahoma State)

¶Edward Kready Kraybill (1939)
M.S.E. (Michigan)

Harry Ashton Owen, Jr. (1951)
Ph.D. (North Carolina State)

*Assistant Professors*

*Rhett Truesdale George, Jr. (1957)
M.S.E. (Florida)

**James Thomas McKeel (1956)
M.S. (North Carolina State)

Theo Clyde Pilkington (1958)
Ph.D. (Duke)

*Lecturer*

†† Billy Brown Olive (1957)
B.S.E.E. (Duke); LL.B. (St. John's)

*Instructors*

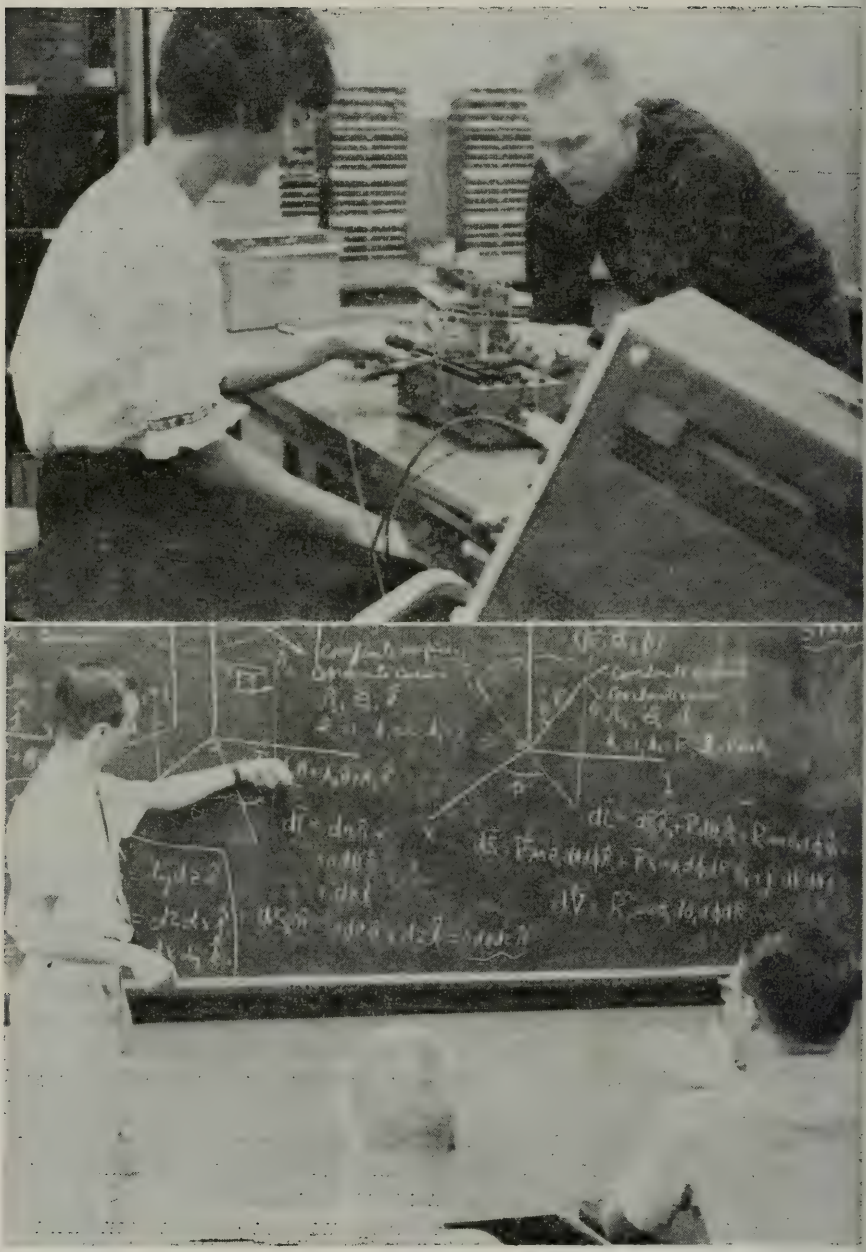
William Edward Hammond (1960)
B.S.E.E. (Duke)

Leonidas John Jones (1958)
M.S. (Duke)

ELECTRICAL ENGINEERING utilizes the electrical and magnetic forces of nature and properties of matter to supply human needs. To an increasing degree its products and services influence the daily living of most of the world's population. It is concerned with the *processing and transmitting of information*—as in radar, television, radio and wire telephony, measurement, electronics, computation, and control. It is equally concerned with the *processing, transmitting, and controlling of energy*—as in solid state converters, magnetohydrodynamic generators, nuclear reactors, rotating machines, power systems, and automatic industrial processes. It provides most of our labor-saving home appliances and many of the instruments of modern scientific research and of modern medical practice.

The professional electrical engineer may engage in consulting, teaching, research, development, design, manufacturing, operation,

¶ Registered Professional Engineer.
†† Registered Patent Attorney.
* Sabbatical Leave, Fall Semester, 1963-64.
** Sabbatical Leave, Academic Year, 1963-64.



maintenance, management and sales. His education must therefore provide a fundamental understanding of both the science of electrical engineering, which is based on mathematics and the physical sciences, and the art of electrical engineering, which depends on human imagination and judgment. It must also prepare him to serve as a responsible member of society by providing him with an appreciation of the humanities and the social sciences.

The program in electrical engineering at Duke, therefore, does not stress the mere acquisition of specific skills and methods, but seeks, in both classroom and laboratory, to stimulate students to think creatively in terms of fundamental concepts. It is hoped that, once started, creativity may become a habit.

Such a program requires an able staff, extensive library resources, and well-equipped laboratories, such as are found here. Some idea of the range of interests in electrical engineering which are included in this program may be conveyed by a brief survey of the laboratory activities of the Department.

In the *Fields and Circuits Laboratory* the configurations of two- and three-dimensional fields are studied by several different analog techniques. Complex network functions are studied by means of an electrolytic tank mapper. Nonsinusoidal waves are synthesized and analyzed, and oscillographic studies are made of both steady-state and transient behavior of direct-current circuits and single-phase and polyphase alternating-current circuits.

The *Solid-State Materials Laboratory* is being developed for both instructional and research projects in which the macroscopic properties of materials, as exploited in devices, are studied at the microscopic and molecular levels.

The *Electronics Laboratories* are equipped for the study of the physical behavior of basic electronic components and of advanced electronic devices throughout the sub-radio frequency region.

In the *Radio-Frequency Laboratory* studies are made of radio-frequency systems and their component parts throughout the radio-frequency spectrum. Applications to television and radar are shown.

In the *Energy Conversion Laboratory* the principles of generation, transformation, and control of energy are studied as they are applicable to large-scale power systems and small self-contained systems. Thermoelectric generators, photovoltaic sources, transformers, a-c and d-c motors and generators, and their associated controls are included in this work.

In the *Automatic Control Systems Laboratory* studies are made of the principles underlying the fields of instrumentation and automatic control. Equipment is available for synthesizing control systems and for determining control system performance.

The *Computer Laboratory* contains a general-purpose electronic

analog computer. This device is used in solving higher-order differential equations that are descriptive of the dynamic behavior of complex physical systems. A card-punch machine is available for use in programming problems for solution on the digital computer at the University Digital Computer Laboratory.

In the *Ferromagnetics Laboratory* investigations are being conducted into such properties of ferromagnetic materials as magneto thermal, magneto-optical, magneto-resistive and magneto-strictive effects.

Research in the *Superconducting Circuits Laboratory* is directed toward exploiting for engineering application some of the unique physical phenomena which are observed to obtain at temperatures in the vicinity of absolute zero. Related thin-film research is in progress.

In the work of the *Spacecraft Systems Laboratory* principles from all phases of electrical engineering are brought to bear upon problems encountered in modern spacecraft technology.

Through *Amateur Radio Station W4AHY*, which is licensed to operate on the popular amateur bands using both voice and code transmission, interested engineering students who hold licenses may gain practical experience in short-wave radio.

## *Program of Studies for the Degree of Bachelor of Science in Electrical Engineering*

### §*Freshman Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Engrg | 1 | Engineering Graphics | 2 | Engrg | 2 | Descriptive Geometry | 2 |
| Engl | 1 | English Composition | 3 | Engl | 2 | English Composition | 3 |
| Hist | 1 | Modern History | 3 | Hist | 2 | Modern History | 3 |
| Math | 21 | Introductory Calculus | 3 | †Math | 22 | Introductory Calculus | 3 |
| Phys | 41 | General Physics | 4 | Phys | 42 | General Physics | 4 |
| PE | | Physical Education | 1 | PE | | Physical Education | 1 |
| | | | *16 | | | | *16 |

† Courses which must be passed before engineering academic standing can be advanced. (See page 53.)

* Freshman engineering students taking Air Science or Naval Science will schedule certain courses in addition to the 16 semester hours prescribed for each semester.

§ There is a single common program in the Freshman Year; final choice of a department is not made until the time of registration for the sophomore year.

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 1 | Gen. Inorganic Chemistry | 4 |
| Econ | 51 | Principles of Economics | 3 |
| EE | 53 | E. E. Fundamentals | 1 |
| EE | 55 | Electric Networks I | 4 |
| Engl | 93 | Technical Communication | 3 |
| Math | 63 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 2 | Gen. Inorganic Chemistry | 4 |
| Econ | 52 | Principles of Economics | 3 |
| †EE | 56 | Electric Networks II | 4 |
| Engrg | 60 | Engineering Mechanics | 4 |
| Math | 64 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 109 | Electromagnetic Systems | 4 |
| EE | 111 | Electrical Prin. Lab. | 2 |
| Engrg | 107 | Mechanics of Materials | 3 |
| Math | 111 | Applied Math Analysis I | 3 |
| Phys | 161 | Modern Physics | 3 |
| ‡Approved Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| †EE | 110 | Electromagnetic Systems | 4 |
| EE | 112 | Electrical Prin. Lab. | 1 |
| Engrg | 128 | Fluid Mechanics | 3 |
| Math | 112 | Applied Math Analysis II | 3 |
| ME | 103 | Thermodynamics | 3 |
| ME | 116 | M. E. Laboratory | 1 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

### *Senior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 165 | Seminar | 1 |
| EE | 181 | Electronic Networks | 3 |
| EE | 183 | Electronics Laboratory | 1 |
| EE | 191 | Electric Machinery | 3 |
| EE | 193 | Elec. Mach. Laboratory | 1 |
| ‡EE Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 166 | Seminar | 1 |
| EE | 182 | Electronic Networks | 3 |
| EE | 184 | Electronics Laboratory | 1 |
| EE | 192 | Electric Machinery | 3 |
| EE | 194 | Elec. Mach. Laboratory | 1 |
| ‡Approved Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

‡ Part of a planned program of electives to be chosen in consultation with the advisor. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

## *Undergraduate Courses*

EE 53. ELECTRICAL ENGINEERING FUNDAMENTALS.—Survey of electrical engineering profession: role of engineering and professional engineering societies in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction to staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h.
KRAYBILL AND MEIER

EE 55. ELECTRIC NETWORKS I.—Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Prerequisite: Physics

42. Concurrent: Mathematics 63. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 56. ELECTRIC NETWORKS II.—Network impedance and admittance functions; steady-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Mathematics 64. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 109-110. ELECTROMAGNETIC SYSTEMS.—Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic materials. Prerequisite: EE 56. Concurrent: Mathematics 111. Three class sessions and one two-hour computation. 8 s.h. ARTLEY AND JACKSON

EE 111-112. ELECTRICAL PRINCIPLES LABORATORY.—Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite: EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. JACKSON, LEFLOCH, AND PALMER

EE 123. FUNDAMENTALS OF ELECTRICAL ENGINEERING.—Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering: principles of electric circuits, fields, and electronics. Prerequisites: Mathematics 63 and Physics 42. Concurrent: EE 125. Three class sessions. 3 s.h. HAMMOND AND HUNT

EE 124. INDUSTRIAL ELECTRICAL ENGINEERING.—Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering: alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. HUNT

EE 125. ELECTRICAL FUNDAMENTALS LABORATORY.—Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. HAMMOND, HUNT, OWSLEY, AND PALMER

EE 126. INDUSTRIAL ELECTRICAL LABORATORY.—Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. HALL AND OWSLEY

EE 127. *ELECTRONICS FOR ENGINEERS.—Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering: amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. STAFF

EE 159. *TRANSMISSION.—Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110; Mathematics 111. Elective for electrical majors. 3 s.h. SEELEY

EE 165-166. ELECTRICAL ENGINEERING SEMINAR.—A course which provides the opportunity for students to keep abreast of current progress in engineering and to improve their ability to communicate more effectively. Required for seniors; juniors may participate, but without credit. One class session. 2 s.h. STAFF

EE 173-174. *PROJECTS IN ELECTRICAL ENGINEERING.—A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of

* Offered only upon sufficient demand; enrollment limited.

the Chairman of the Department must be obtained before registering. Elective for electrical majors. 1-6 s.h. STAFF

EE 177. *ENERGY TRANSMISSION AND RADIATION.—A more advanced treatment of electromagnetic theory than is afforded by EE 109-110, with particular application to wave guides and antennas. Prerequisite: EE 110 and permission of instructor. Three class sessions. 3 s.h. ARTLEY

EE 179. *ADVANCED ELECTRICAL MEASUREMENTS.—Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. OWEN

EE 181-182. ELECTRONIC NETWORKS.—Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; microwave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. OWEN AND PILKINGTON

EE 183-184. ELECTRONICS LABORATORY.—Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. CHAMBERS, FENG, AND OWEN

EE 191-192. ELECTRIC MACHINERY.—Application of circuit and field principles to underlying theory of static and rotating electric machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. MEIER AND WILSON

EE 193-194. ENERGY CONVERSION LABORATORY.—Selected experiments in energy conversion combining the theory and practice of transformers, electromechanical devices including motors and generators, photovoltaic sources, thermoelectric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 192-193. 2 s.h. HALL, WILSON, AND YU

EE 199. *LINEAR FEEDBACK SYSTEMS.—Analysis and design of linear, continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: permission of instructor. 3 s.h. JONES AND KOEPSEL

## *Programs of Studies in Electrical Engineering for the Degrees of Master of Science and Doctor of Philosophy*

Through the Graduate School of Arts and Sciences, the Department of Electrical Engineering offers work leading to the degrees of Master of Science and Doctor of Philosophy. Students on these programs may specialize in any of the following fields: solid-state materials and devices, ferromagnetics, superconducting circuits, instrumentation, electronics, microwaves, computers and automatic control, and information processing. Major credit in electrical engineering may be given for graduate level physics courses in the area of microwaves.

* Offered only upon sufficient demand; enrollment limited.

A minimum of 30 units of earned graduate credit is required for the M.S. degree: at least 12 in engineering, 6 in related minor work (normally, mathematics, physics, or chemistry), 6 in either the major or minor subject or in other areas appropriate to the program, and 6 for a research-based thesis. There is no language requirement for this degree.

The minimum requirements for the Ph.D. degree include: 48 units of course credits (normally 24 in electrical engineering and 24 in mathematics and physics), a reading knowledge of two foreign languages (normally French and German), and an acceptable research-based dissertation.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.

## *Graduate Courses*

PROFESSOR WILSON, CHAIRMAN; ASSOCIATE PROFESSOR OWEN, DIRECTOR OF GRADUATE STUDIES; PROFESSORS MEIER AND VAIL; ASSOCIATE PROFESSORS ARTLEY, BURGER, AND KOEPSEL; ASSISTANT PROFESSOR PILKINGTON

EE 201. ENERGY SYSTEMS.—Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units.
ARTLEY

EE 203, 204. INFORMATION SYSTEMS.—General concepts of information storage, transfer, and processing: information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units
OWEN

EE 207. *NETWORK SYNTHESIS.—Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units.
KOEPSEL, OWEN, AND VAIL

EE 211. SOLID STATE THEORY.—The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units.
ARTLEY, BURGER, PILKINGTON, AND VAIL

EE 212. SOLID STATE MATERIALS.—Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Pre-requisite: EE 211. 3 units
ARTLEY, BURGER, PILKINGTON, AND VAIL

* Offered only upon sufficient demand; enrollment limited.

EE 213. MAGNETICS.—A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units. ARTLEY AND WILSON

EE 215, 216. SOLID-STATE DEVICES.—Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Pre-requisite: permission of instructor. 6 units. BURGER AND PILKINGTON

EE 221. NONLINEAR ELECTROMAGNETICS.—Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. WILSON

EE 222. NONLINEAR ANALYSIS.—Introduction to methods of analyzing engineering systems described by nonlinear differential equations; analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear reasonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. WILSON

EE 231. *NUCLEAR ENGINEERING.—Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units. MEIER

EE 241. *FEEDBACK CONTROL SYSTEMS.—Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; nonstationary and nonlinear systems. Prerequisite: permission of instructor. 3 units.

KOEPSEL AND WILSON

EE 242. *OPTIMUM CONTROL SYSTEMS.—Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; quadratic and non-quadratic performance criteria; adaptive control systems; computer applications in control. Prerequisite: permission of instructor. 3 units. KOEPSEL

EE 243. *NONLINEAR CONTROL SYSTEMS.—Analysis and design of nonlinear feedback control systems; approximations for small and for large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. KOEPSEL AND WILSON

EE 259. *ADVANCED ELECTRIC ENERGY CONVERSION.—Equations of motion of electromechanical systems; fields and lumped parameters; state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructor. 3 units.

MEIER AND WILSON

EE 265. *ADVANCED TOPICS IN ELECTRICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

* Offered only upon demand, enrollment limited.

EE 297, 298. THESIS RESEARCH.—A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 6 units.

MEMBERS OF THE GRADUATE STAFF

EE 399. *SPECIAL READINGS IN ELECTRICAL ENGINEERING.—Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 units.

MEMBERS OF THE GRADUATE STAFF

* Offered only upon sufficient demand; enrollment limited.

# Department of Mechanical Engineering

*Chairman and Director of Undergraduate and Graduate Studies:*
JOHN NELSON MACDUFF

*Professors*

¶AUSTIN HARRIS CHURCH (1963), *Visiting*
M.S. (New York University)

¶VAN LESLIE KENYON, JR. (1945)
M.M.E. (Delaware)

¶JOHN NELSON MACDUFF (1956)
M.M.E. (New York University)

¶JAMES LATHROP MERIAM (1963)
*Professor of Engineering Mechanics*
Ph.D. (Yale)

*Associate Professors*

**¶THOMAS ALLAN BOYLE (1957)
M.S. in M.E. (Lehigh)

**¶ERNEST ELSEVIER (1950)
M.S. in M.E. (Georgia Institute of Technology)

*Assistant Professors*

*¶GALE HERBERT BUZZARD (1957)
M.S. (Duke)

¶CHARLES MORGAN HARMAN (1961)
Ph.D. (Wisconsin)

¶RALPH ELTON LEWIS (1941)
M.S. in M.E. (Illinois)

¶THOMAS HAWKES NASH, JR. (1959)
B.S. (Iowa State)

*Lecturer*

FOREST ORION MIXON, JR. (1963), *Visiting.*
Ph.D. (Delaware)

THE MECHANICAL ENGINEER is concerned with the design and construction of equipment to convert energy from natural sources into useful work and to utilize energy effectively to process goods. He is also concerned with the organization of men and machines for the manufacture of products. To fulfill these functions, the mechanical engineer must possess a thorough knowledge of the basic sciences and be adept in using this knowledge to find optimum solutions to the problems with which he is confronted. In general, he would pursue a career in one of the following comprehensive fields: (1) research, development and design; (2) production, manufacturing and operation; and (3) management.

The mechanical engineering curriculum at Duke University provides a balance between basic sciences, mathematics, engineering sciences, social sciences, humanities and professional engineering courses. Flexibility is provided in the form of electives by which the student may emphasize particular goals of his own choosing. The elective programs may be chosen to provide a strong minor in mathematics, the physical sciences, economics, or the humanities. Outstand-

¶ Registered Professional Engineer.
* Leave of Absence, Academic Year, 1963-64.
** Sabbatical Leave, Academic Year, 1963-64.

ing students may elect in their senior year projects which test and develop their ability to do research work.

The curricular and extracurricular activities provide an excellent opportunity to develop scientific knowledge, mental discipline, judgment and ingenuity, leadership, and ethical responsibilty.

Digital computer programming and the use of numerical methods are introduced at the sophomore level. Programs are prepared by students and staff in the Engineering Building and are processed on the large-scale computer in the adjacent Mathematics-Physics Building.

The laboratories and their associated apparatus provide facilities both for undergraduate instruction and for graduate level research. For the undergraduate, laboratory work strengthens the student's understanding of the fundamentals taught in the classroom and serves as an introduction to experimental investigations. At the graduate level, laboratory investigations are a necessary part of research and an important part of the educational program; they also validate data and theories used in design. Duke provides equipment for studies in each of the major fields of mechanical engineering.

The laboratories are well equipped with the instruments needed for a wide range of tests and investigations. Reflecting the modern trend toward higher speeds, a large amount of electronic test equipment is in use. This includes many cathode-ray oscilloscopes, several analog computers, and strain-gage bridges. There is also a hot-wire anemometer, recording oscillograph, and photographic equipment.

Thermodynamics is fundamental to power generation, whether in rocket engines, direct energy conversion, nuclear plants or the more conventional turbines and engines. Power equipment also provides an excellent opportunity to study the applications of heat transfer mechanisms and the chemistry of combustion.

Internal combustion engines, including two Diesel engines and two automobile engines, are available for undergraduate laboratory experiments. A CFR variable compression-ratio engine, in a separate laboratory with complete control and testing equipment, is available for further investigations by seniors and graduate students. Indicator diagrams can be obtained either through electronic strain-gages or with purely mechanical devices.

Basic thermodynamic experiments are also performed on such apparatus as a large single-stage air compressor, steam turbines, heat exchangers, and experimental refrigeration equipment.

Heat flow problems are studied by using thermocouples or resistance thermometers to determine temperature distribution on actual equipment. For steady-state conduction problems, the experimental results are compared with the results obtained from analog water tanks, teledotois paper flux plots, and digital computer calculations.

Transient heat conduction problems are investigated with an electric analog system.

Fluid flow problems are investigated with special equipment for studying flow in pipes, an orifice jet tank, and a nozzle thrust measuring stand. An axial flow fan with plenum chambers and nozzle bank and a centrifugal fan fitted with orifices and a pitot tube are also used. A steam vacuum ejector furnishes the necessary pressure difference to permit the investigation of air flow at Mach numbers of one or more. A water table permits the investigation of flow shock waves, and may also be used for studying such devices as the fluid jet amplifier. A high-pressure hydraulic system is also available.

The experimental study of mechanical systems is begun on single-degree-of-freedom systems. Simple systems are used for free vibration studies, while excitation for forced vibration of other systems is provided by a mechanical vibration table and an electro-dynamic shaker. Pickups, strain gage amplifiers, and associated recording equipment are available for measurement.

Simple feedback control systems are investigated with a flow control system, an air turbine position control test stand, and a pneumatic position control system.

Analog computers are used for more sophisticated study of both thermal and mechanical systems. Accessory equipment, in addition to the normal recording apparatus, includes an x-y plotter, function generators, multipliers, and varistors for approximate simulation of simple nonlinear systems. The measurement and excitation equipment, as well as the analog computer, is used for graduate and staff research, as well as for undergraduate instruction.

Stress analysis is studied in the laboratory using wire and crystal strain gages as primary sensing elements. A polariscope test stand permits visual observation and measurement of stresses. A metallographic laboratory is also available.

A photographic darkroom and shop facilities are available to support student and faculty projects, and for special instruction.

# *Program of Studies for the Degree of Bachelor of Science in Mechanical Engineering*

## §*Freshman Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Engrg | 1 | Engineering Graphics | 2 | Engrg | 2 | Descriptive Geometry | 2 |
| Engl | 1 | English Composition | 3 | Engl | 2 | English Composition | 3 |
| Hist | 1 | Modern History | 3 | Hist | 2 | Modern History | 3 |
| Math | 21 | Introductory Calculus | 3 | †Math | 22 | Introductory Calculus | 3 |
| Phys | 41 | General Physics | 4 | Phys | 42 | General Physics | 4 |
| PE | | Physical Education | 1 | PE | | Physical Education | 1 |
| | | | *16 | | | | *16 |

## *Sophomore Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Chem | 1 | General Inorganic Chem. | 4 | Chem | 2 | General Inorganic Chem. | 4 |
| Engrg | 60 | Statics and Dynamics | 4 | Engrg | 107 | Mechanics of Materials | 3 |
| Math | 63 | Intermediate Calculus | 3 | Engrg | 109 | Materials Laboratory | 1 |
| ME | 52 | Kinematics Kinetics | 3 | †Math | 64 | Intermediate Calculus | 3 |
| ‡Humanities-Social Studies Elective | | | 3 | ME | 105 | Dynamics of Fluids | 3 |
| PE | | Physical Education | 1 | ‡Humanities-Social Studies Elective | | | 3 |
| | | | | PE | | Physical Education | 1 |
| | | | 18 | | | | 18 |

## *Junior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| EE | 123 | Fundamentals of E. E. | 3 | EE | 124 | Industrial E. E. | 3 |
| EE | 125 | Elec. Fundamentals Lab. | 1 | EE | 126 | Industrial Elec. Lab. | 1 |
| Math | 111 | Applied Math Analysis I. | 3 | Engl | 93 | Technical Communication | 3 |
| ME | 101 | Thermodynamics | 3 | Math | 112 | Applied Math Analysis II. | 3 |
| †ME | 106 | Heat Transfer | 3 | †ME | 102 | Thermodynamics | 3 |
| ME | 141 | Machine Design | 3 | ME | 114 | M. E. Laboratory | 2 |
| ‡Humanities-Social Studies Elective | | | 3 | †ME | 142 | Machine Design | 3 |
| | | | 19 | | | | 18 |

## *Senior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Econ | 51 | Principles of Economics | 3 | ME | 156 | Combustion Engines | 3 |
| ME | 59 | Materials and Processes | 3 | ME | 160 | M. E. Laboratory | 1 |
| ME | 159 | M. E. Laboratory | 1 | ME | 162 | Power Plants | 3 |
| ME | 171 | Response of Phys. Systems | 3 | ME | 174 | Seminar | 1 |
| ME | 173 | Seminar | 1 | ‡Approved Electives | | | 6 |
| ME | | Elective | 3 | ‡Humanities-Social Studies Elective | | | 3 |
| ‡Approved Electives | | | 6 | | | | |
| | | | 20 | | | | 17 |

† Courses which must be passed before engineering academic standing can be advanced. (See page 53.)

* Freshman engineering students taking Air Science or Naval Science will schedule certain courses in addition to the 16 semester hours prescribed for each semester.

‡ Part of a planned program of electives to be chosen in consultation with the Advisor. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

§ There is a single, common program in the Freshman Year; final choice of a department is not made until the time of registration for the sophomore year.

# *Undergraduate Courses*

ME 52. KINEMATICS, KINETICS.—Analytical and numerical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for automatic machines, application of work, energy, impulse and momentum. Prerequisite: Engrg 2, Phys 41; concurrent: Math 63. 3 s.h. MACDUFF

ME 59. MATERIALS AND PROCESSES.—Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: senior standing. 3 s.h. STAFF

ME 101-102. ENGINEERING THERMODYNAMICS.—A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisite: Chem 1, Phys 42; concurrent: Math 64. 6 s.h. KENYON

ME. 103. THERMODYNAMICS.—A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapors; elements of combustion and heat transfer. Prerequisite: Chem 1, Phys 42; concurrent: Math 64. 3 s.h. MIXON

ME 105. DYNAMICS OF FLUIDS.—A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41, Math 63. 3 s.h. KENYON

ME 106. HEAT TRANSFER.—A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 102, 105; Math 64. 3 s.h. KENYON

ME 114. JUNIOR MECHANICAL ENGINEERING LABORATORY.—Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 101-102, ME 105, 106. 2 s.h. STAFF

ME 116. MECHANICAL ENGINEERING LABORATORY.—Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamic properties of systems. Student planning of experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. STAFF

ME 128. *DYNAMICS OF GASES.—The flow of compressible fluids at high velocities. One-dimensional compressible flow: area change; normal shock; friction and heat transfer; Mach number. Prerequisite: ME 102; concurrent: ME 106. 3 s.h. STAFF

ME 141. MACHINE DESIGN.—Elements of mechanism with special attention to the role of invention in mechanical design. Velocity and acceleration in mechanisms from both scalar and vector viewpoints. Prerequisite: Math 63; concurrent: ME 52. E 57 or 60. 3 s.h. NASH

ME 142. MACHINE DESIGN.—Continuation of ME 141. Static and dynamic forces in machinery. The instant center; theory of gear tooth profiles. Design of machine elements, such as gears, springs, and bearings; complex parts. Prerequisite: ME 141; concurrent E 107. NASH

ME 153. *HEATING, AIR CONDITIONING AND REFRIGERATION.—Principles of thermodynamics, heat transfer and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression,

* Offered only upon sufficient demand; enrollment limited.

absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. Harman

ME 156. COMBUSTION ENGINES.—A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern developments. Prerequisite: ME 102. 3 s.h. Harman

ME 157. *PUMPS, COMPRESSORS AND TURBINES.—An introduction to the theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h. Boyle

ME 159-160. SENIOR MECHANICAL ENGINEERING LABORATORY.—Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. Staff

ME 162. POWER PLANTS.—Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. Harman

ME 163. *VIBRATION CONTROL.—An introduction to the dynamics of mechanical systems; equilibrium, stability, lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog simulation. Prerequisite: Math 64, ME 141. 3 s.h. Church

ME 164. *ENGINEERING ANALYSIS.—A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretations of results. Concurrent: Math 64. 3 s.h. Boyle

ME 166. *AIR CONDITIONING DESIGN.—Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. Harman

ME 167. INDUSTRIAL ENGINEERING.—A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: senior standing. 3 s.h. Lewis

ME 168. *INDUSTRIAL ENGINEERING PRODUCTION METHODS.—Study of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: senior standing, ME 167 or equivalent. 3 s.h. Lewis

ME 171. RESPONSE OF PHYSICAL SYSTEMS.—An introduction to the basic fundamentals of instrumentation and of the control of processes and systems with emphasis on correlation of analysis and experimental results. Concurrent: Math 111. 3 s.h. Church and Macduff

ME 173-174. MECHANICAL ENGINEERING SEMINAR.—A course designed to keep the students abreast of progress in the engineering field and to develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. Staff

ME 182. *FUNDAMENTALS OF NUCLEAR ENGINEERING.—Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope utilizations, reactor systems and power reactors. Prerequisite: permission of instructor. 3 s.h. Kenyon

ME 197-198. PROJECTS IN MECHANICAL ENGINEERING.—This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct

* Offered only upon sufficient demand; enrollment limited.

field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. STAFF

## *Program of Studies in Mechanical Engineering for the Degree of Master of Science*

Through the Graduate School of Arts and Sciences, the Department of Mechanical Engineering offers work leading to the degree of Master of Science. As a prerequisite to graduate study the student normally must have been awarded a Bachelor's degree in an accredited engineering curriculum. Minimum prerequisites to the graduate courses in mechanical engineering are a knowledge of differential equations, undergraduate thermodynamic theory, kinematics, mechanics, and machine design.

A minimum of 30 units of earned graduate credit is required for the M.S. degree: at least 12 units in the major subject area, a minimum of 6 units in related minor work outside of engineering, 6 units in either major or minor subject, and 6 units for a research-based thesis. There is no language requirement for the M.S. degree.

## *Graduate Courses*

PROFESSOR MACDUFF, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES; PROFESSORS CHURCH, KENYON, AND MERIAM; ASSOCIATE PROFESSORS ELSEVIER AND BOYLE; ASSISTANT PROFESSOR HARMAN

ME 201. *THEORETICAL AND APPLIED MECHANICS.—Introduction to the theory of elasticity, and vibration analysis. 3 units. CHURCH

ME 202. *THEORETICAL THERMODYNAMICS.—Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. HARMAN

ME 221. *ANALYSIS OF INCOMPRESSIBLE AND COMPRESSIBLE FLUID FLOW.—Flow of incompressible and compressible fluids; concepts of subsonic, sonic, and supersonic flow; experimental methods. 3 units. HARMAN

ME 222. *ANALYSIS OF HEAT TRANSFER.—Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units. KENYON

ME 231-232. *SYSTEMS ENGINEERING.—Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. CHURCH AND MACDUFF

ME 265. *ADVANCED TOPICS IN MECHANICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite; approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

ME 280. *NUCLEAR REACTOR POWER CYCLES.—Introduction to basic reactor principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat

* Offered only upon sufficient demand; enrollment limited.

transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units.

KENYON

ME 297, 298. THESIS RESEARCH.—A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 units. MEMBERS OF THE GRADUATE STAFF

# Subjects Common to All Curricula

## *Interdepartmental Engineering Subjects*

ENGRG. 1. ENGINEERING GRAPHICS.—The study of engineering graphics with emphasis on third angle projection, pictorial drawing, dimensioning, working drawings, pencil and ink techniques. 2 s.h. HAINES, LEWIS, AND STAFF

ENGRG. 2. DESCRIPTIVE GEOMETRY.—A study of drawing board geometry with emphasis on line and plane problems, developments, and intersections. Further emphasis on drawing techniques. Prerequisite: Engrg. 1. 2 s.h.
HAINES, LEWIS, AND STAFF

ENGRG. 57. STATICS.—A study of force systems, equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisite: Engrg. 1, Phys. 41; concurrent: Math 63. 3 s.h. ARGES, WILLIAMS, AND WOOD

ENGRG. 60. ENGINEERING MECHANICS.—A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using vector and scalar values. Concurrent: Phys. 42 and Math 63. 4 s.h.
HARRAWOOD AND HILL

ENGRG. 107. MECHANICS OF MATERIALS.—Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area-moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60; concurrent: Math 64. 3 s.h.
ARGES, PALMER, AND SHEPPARD

ENGRG. 109. MECHANICS OF MATERIALS LABORATORY.—Study and use of testing machines and strain gages; tests to determine significant mechanical properties of the common engineering materials; experimental verification of the elementary theory of structural members. Must be preceded or accompanied by Engr. 107. 1 s.h. ARGES AND SHEPPARD

ENGRG. 115. DYNAMICS.—General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum. gyroscopic motion. Prerequisite: Engrg 57; concurrent: Math 64. HILL

ENGRG. 128. FLUID MECHANICS.—Physical properties of fluids, fluid statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic similarity, fluid flow in closed conduits and in open channels, fluid measurements. Prerequisite: Engrg 60, Engrg 115 or ME 52, Math 64. 3 s.h.
HARRAWOOD, WILLIAMS, AND WOOD

ENGRG. 153. *ARCHITECTURAL ENGINEERING.—The application of engineering principles to architecture; the influence of engineering function and trends on design; the interrelationship of engineering with architecture; the analysis of structural details and of processes of construction; field trips and inspection of construction projects. Prerequisite: permission of instructor. 3 s.h. HAINES

ENGRG. 169. *LEGAL ASPECTS OF ENGINEERING.—A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real

* Offered only upon sufficient demand; enrollment limited.

and personal property, torts, insurance, agency, equity, evidence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h.
Olive

ENGRG. 170. *PATENT LAW FOR ENGINEERS.—A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h.
Olive

## *Non-Engineering Subjects*

CHEM. 1-2. GENERAL INORGANIC CHEMISTRY.—Elementary principles of chemistry: the structure, properties, preparation and uses of the elements and their compounds. Laboratory work includes qualitative analysis of some of the more common metals. One lecture, two recitations, and three laboratory hours, throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. 8 s.h.

COLLOQUIUM 101, 102. 2 s.h. (See *Bulletin of Undergraduate Instruction* for description.)

ECON. 51, 52. PRINCIPLES OF ECONOMICS.—6 s.h.

ENGL. 1-2. ENGLISH COMPOSITION.—Required of all freshmen. 6 s.h.

ENGL. 93. TECHNICAL COMMUNICATION.—Emphasis will be placed on the writing of business letters, technical reports, and articles for submission to technical journals. Approximately one third of the course will provide training in the oral presentation of various materials. Prerequisite: English 1 and 2. 3 s.h.

HIST. 1-2. MODERN HISTORY.—Required of all freshmen. 6 s.h.

MATH. 21-22. INTRODUCTORY CALCULUS.—Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: two and one-half units of college preparatory mathematics. Math. 21 is prerequisite for math 22. 6 s.h.

MATH. 63-64. INTERMEDIATE CALCULUS.—Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Math. 22 for 63; and 63 for 64. 6 s.h.

MATH. 111. APPLIED MATHEMATICAL ANALYSIS I.—Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Mathematics 131 or 139. Prerequisite: Math. 53 or 64. 3 s.h.

MATH. 112. APPLIED MATHEMATICAL ANALYSIS II.—Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Math. 64. 3 s.h.

PHYS. 41-42. GENERAL PHYSICS.—Treats the basic principles of general physics in a more quantitative manner than Physics 1-2. Not open for credit to students who have taken Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Concurrent: Math. 21-22. 8 s.h.

PHYS. 161, 162. MODERN PHYSICS.—Review of electromagnetic fields; relativity; quantum phenomena; atomic and molecular spectra; solids; and the nuclear physics. Three lectures per week. Prerequisite: Physics 41-42, Math. 22. Physics 161 is prerequisite for 162. 6 s.h.

For additional non-engineering courses consult the *Undergraduate Bulletin*.

* Offered only upon sufficient demand; enrollment limited.

# *Recommended Minor Subjects for Graduate Students*

CHEM. 206. ELEMENTS OF THEORETICAL CHEMISTRY.—A course in the general principles of physical chemistry for students who do not present credit in calculus. Credit is not given for both 206 and 261-262. Three recitations and three laboratory hours. Prerequisites: quantitative analysis, organic chemistry 8 units; physics 8 units, and mathematics 6 units. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 units.

CHEM. 261-262. PHYSICAL CHEMISTRY.—Fundamentals of general theoretical chemistry illustrated by selected laboratory experiments. Three recitations and three laboratory hours. Prerequisites: quantitative analysis, organic chemistry 8 units; physics 8 units, differential and integral calculus. 8 units.

MATH. 221. DIGITAL COMPUTER.—History of computers; number representation, information, storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. 3 units.

MATH. 222. INTRODUCTION TO NUMERICAL ANALYSIS.—Error analysis; real and complex roots of equations; finite difference methods and theory of interpolation; numerical differentiation and integration; numerical integration of ordinary and partial differential equations; simultaneous equations and matrix inversion. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Math. 221. 3 units.

MATH 283. PROBABILITY FOR ENGINEERS.—Basic probability concepts, sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimations, hypothesis testing. Prerequisite: calculus. 3 units.

MATH. 285. APPLIED MATHEMATICAL METHODS I.—Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Math. 53. 3 units.

MATH. 286. APPLIED MATHEMATICAL METHODS II.—Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions. Schrödinger's equation. Prerequisite: Math. 53. 3 units.

MATH. 291-292. THEORY OF FUNCTIONS.—Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: calculus. 6 units.

PHYS. 201, 202. MECHANICS.—The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and rigid bodies; the methods of Lagrange and Hamilton; generalized mechanics. Prerequisite: Physics 125. 6 units.

PHYS. 213, 214. CONTEMPORARY PHYSICS.—A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 units.

PHYS. 219. ELECTRICITY AND MAGNETISM.—Fundamentals of electricity and magnetism. Physical optics. Electromagnetic waves. 3 units.

PHYS. 221, 222. THEORETICAL PHYSICS.—Mechanics of particles and of rigid

bodies, elasticity, fluids dynamics, electrodynamics; optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285, 286 or equivalent to be taken at least concurrently. 6 s.h.

PHYS. 318-319. ELECTROMAGNETIC FIELD THEORY.—Electrostatics and potential theory; dielectric and magnetic media; the magnetic field of currents and the law of induction. Maxwell's electrodynamics; theory of wave optics; refraction; interference and diffraction; relativity. Prerequisite: Physics 219. 6 units.

PHYS. 331. MICROWAVE RADIATION.—Microwave generators, cavity resonators, transmission lines, radiation propagation and detection. 3 units.

For additional courses consult the *Bulletin of The Graduate School of Arts and Sciences.*

# Reserve Officers Training Corps

THROUGH the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in the effort to provide a steady supply of well-educated officers for the active and reserve forces of the nation.

## *The Naval Reserve Officers Training Corps*

There are two basic programs through which students can qualify for Naval commissions upon graduation: one, the Regular Naval Reserve Officers Training Corps program, provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve.

## *The Air Force Reserve Officers Training Corps*

The unit functions as a regular department of instruction known as the Department of Air Science. It selects and trains students who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers.

# Financial Information, Living and Dining Accommodations

FEES paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

## *Estimated Expenses for an Academic Year*

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases shown as follows:

| | *Undergraduate Men* | | *Undergraduate Women* | |
|---|---|---|---|---|
| Tuition | $1,050.00 | | $1,050.00 | |
| General Fee | 187.00 | | 187.00 | |
| Room Rent | 250.00 | | 275.00 | |
| Board | 500.00 | (Cafeteria estimate) | 450.00 | (Board Rate) |
| Books and Supplies | 70.00 | | 70.00 | |
| Miscellaneous expenses | 443.00 | (Moderate estimate) | 443.00 | (Moderate estimate) |
| Estimated Totals | $2,500.00 | | $2,475.00 | |

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of $2500.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

## *Undergraduate Tuition and Fees*

The semester tuition of $525.00 and general fee of $93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

New students, on notification of acceptance, are required to pay a non-refundable first registration fee of $20.00 and to make a deposit of $50.00. The $50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate $25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining $25.00 as a continuing pre-registration deposit, which at the time of pre-registration will reserve a place in classes for the following semester. Arrangements for refund of the $25.00 room deposit are described in information furnished each resident student by the Housing Bureau. The $25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

Students who have been re-admitted to the University after an absence of one or more semesters, on notification of re-admission, are required to make the $50.00 room and registration deposits.

An Air Force ROTC deposit of $20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

In the regular academic year students who register for no more than two courses with a maximum credit of 8 semester hours are classified as special students. They are charged a registration fee of $5.00 for each course and $35.00 for each semester hour of course credit. Registration for 9 or more semester hours, or 3 or more courses, requires payment of full fees.

Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than 8 semester hours may audit other courses by payment of $15.00 for each course audited. Auditors submit no daily work, take no examinations, and receive no credit for courses audited.

One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Treasurer for all indebtedness.

Bills may be sent to parents or guardians provided the Treasurer has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

# *Financial Aid*

Duke University is interested in students with ability and ambition, hence it is the aim of the University to provide, insofar as possible, the financial assistance required by worthy students. This assistance takes various forms.

Scholarships and prizes enable students with inadequate resources to reduce the amount payable to the University. Loans are made available. Through the Student Employment Offices part-time jobs are arranged. Through the Financial Aid Program an earnest effort is made to eliminate the economic status of the student as a criterion for admission.

The actual cost to the University for each student is more than twice the amount received from the student. The deficit is paid out of the contributions and income from endowment.

## *Undergraduate Scholarships, Loans, and Student Employment*

ENGINEERING SCHOLARSHIP FUND

Established by gifts of various persons; to be used for scholarship aid to engineering students.

THOMAS R. MULLEN, JR., SCHOLARSHIP FUND

Established April 5, 1949, by gift of T. R. Mullen in memory of his son; the income to be used for scholarship assistance to students in the College of Engineering. Preference is to be given students who are children of employees of the Lehigh Structural Steel Company or others nominated by the Company. One award is available each year.

JONES SCHOLARSHIP FUND

Established in 1951 by Edwin L. Jones, Sr., '12; Annabel Lambeth Jones, '12; Edwin L. Jones, Jr., '48; Lucille Finch Jones; and the J. A. Jones Construction Company in memory of James Addison Jones and Raymond A. Jones; a portion of the income to be used for scholarship aid to worthy and qualified students in the College of Engineering.

ALCOA SCHOLARSHIP IN ENGINEERING

Established in 1962 by the Alcoa Foundation. One award of $625.00 per year is made to a student preparing for a career in either electrical or mechanical engineering.

WESTERN ELECTRIC FUND SCHOLARSHIP

Established in 1957 by gift of the Western Electric Fund; a scholarship in the amount of $800.00 is given annually to an outstanding student in the field of electrical engineering who has completed the sophomore year of study.

UNION BAG-CAMP CORPORATION SCHOLARSHIP

Established in 1957 by gift of the Union Bag-Camp Corporation to provide a scholarship of $600.00 to a student in the fields of chemistry or mechanical engineering in alternate years.

Duke University participates in several other industry scholarship programs. Several of these awards for which freshmen may apply are

assigned to engineering students annually although they are not restricted to students in this field of study. Among the available awards are the General Motors Scholarships, and the Texas Company Scholarships.

Students who wish additional detailed information about these awards and other scholarship, loan, or employment opportunities should refer to the *Bulletin of Undergraduate Instruction* or write to the Office of Admissions, Duke University, Durham, North Carolina —27706.

## *Graduate Tuition and Fees*

The following table shows the general fees and charges collected from all graduate students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

| | |
|---|---|
| Tuition and general fees* ($40.00 per unit) | $600.00 |
| Athletic Fee, not including federal tax, optional, per year, payable in the fall semester | 15.00 |
| Room rent (See detailed statement, p. 48). | |
| Fee for Microfilming, payable by candidates for a doctoral degree when the dissertation is presented to the Graduate Office after the final examination | 25.00 |

* General fees, in lieu of most special charges, include the following fees: Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Materials Fees.

Tuition and fees for a full semester program of 15 units amount to $600.00. For a part program, tuition and fees are computed at the rate of $40.00 per unit.

SPECIAL FEES FOR TEACHERS AND OTHERS: The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in full-time teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives of Duke faculty members, (4) full-time employees of Duke University who are paid on a monthly basis throughout the year. The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon the payment of a fee of $5.00 for registration for each semester and a tuition fee of $15.00 per unit of credit.

STIPENDS and INCOME TAX: Ordinarily stipends awarded under fellowships and scholarships are not subject to income tax. However, a portion of the award to graduate assistants may be subject to tax. The Graduate Office will supply detailed information.

## *Graduate Assistance*

Each of the three Departments of Engineering makes available to qualified graduate students a number of teaching internships, part-time instructorships, and research assistantships, each of which permits the holder to carry three-fifths of a normal load of graduate courses. For further information concerning these positions, write to the Chairman of the appropriate Department of Engineering, Duke University, Durham, North Carolina—27706.

SHELL FELLOWSHIP IN ELECTRICAL ENGINEERING. This fellowship is established to encourage graduate studies leading to an M.S. or Ph.D. degree in electrical engineering. Preferential consideration is given to candidates in an advanced stage of their work toward the doctorate. This award provides for a single student or a childless married student a stipend of $2,000 per academic year, or $2,500 per 12 consecutive months of study; or for a married student with one or more children, a stipend of $2,600 per academic year, or $3,200 per 12 consecutive months of study. In addition, the Fellowship provides actual tuition and fees required of the recipient, a special allotment of $1,000 to the major department to be applied toward equipment and materials needed by the Fellow in his research. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Dean, College of Engineering.

For the encouragement and financial assistance of graduate students of marked ability, the University also has established a considerable number of general fellowships. For information concerning these fellowships, write to the Dean of the Graduate School, Duke University, Durham, North Carolina—27706.

## *Living Accommodations*

Undergraduate students are required to live in the residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for the academic year but for no period of less than one semester. No refund will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

In the residence houses for undergraduate, graduate and professional men, the rental charge for a single room is $300.00 for the academic year or $150.00 for each semester. The rental charge for a double room is $500.00 for the academic year or $250.00 for each occupant, or $125.00 per semester for each occupant.

In the residence houses for undergraduate, graduate and professional women on the Woman's College Campus, the rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant, or $137.50 per semester for each occupant.

Regulations governing the occupancy of rooms will be supplied directly from the Housing Bureau when the reservations are made. Occupants are expected to abide by these regulations.

For details concerning living accommodations, see the *Bulletin of Undergraduate Instruction* or the *Bulletin of the Graduate School of Arts and Sciences.*

## *Dining Service*

On the West Campus, dining facilities in the Union include three cafeterias with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The cost for the academic year ranges from $450.00 upward, depending on the tastes of the individual. In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge, where sodas and sandwiches are served. In both West Campus facilities the meals are served on a pay-as-you-go basis.

On the East Campus dining halls are located in the Woman's College Union and in Gilbert-Addoms Dormitory. Resident women take their meals in these halls. The charge for board is $225.00 per semester, payable at the time of registration. There will be no board refund for withdrawal after six weeks from the beginning of class; a refund will be made on a pro rata basis for withdrawals occurring during the first six weeks.

Due to the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

# The Bureau of Testing and Guidance

THE University maintains a Bureau of Testing and Guidance which provides a program of educational, vocational, and personal counseling for students. In addition, the Bureau administers

special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling. Although the counseling, testing, and research services of the Bureau are designed primarily to meet the needs of the students, the faculty, and the staff of Duke University, these services are made available to individuals and organizations outside the University as its facilities permit.

Requests for further information should be addressed to the Director, Bureau of Testing and Guidance, Duke University, Durham, N. C.—27706.

# Employment Opportunities



THE APPOINTMENTS OFFICE is a service agency designed to aid students and alumni in solving the problem of post-college employment. Its primary function is to serve as an intermediary between students and prospective employers. It acquaints students with possibilities in business and professional fields, it assembles comprehensive records on each registrant and makes these records available to appropriate representatives, and it arranges interviews with prospective employers. The data assembled for individual records include academic achievement, training, experience, extracurricular activities, and honors. On occasion additional information of a special nature is secured. Confidential letters of recommendation are incorporated in the file of each registrant. The Office initiates contacts for students or cooperates with students who make contacts through personal efforts or through various departments of the University. It aids the registrant in directing his search to a field appropriate to his aptitude, training, and interest.

There are two major divisions of the Office: the Commercial Division, which handles all matters involving contacts with business and professional areas not related to formal education; and the Educational Division, which concerns itself with teaching and school administration positions at all levels. Students and alumni may register with either or both of these divisions.

The Office receives more calls for qualified personnel than it can supply from its registrants. It is to the mutual advantage of the students and the Office that a complete record of registrants be assembled by the fall of the senior year.

# Undergraduate Registration and Academic Regulations

ORIENTATION PROGRAM: All freshmen and transfer students participate in the activities of Orientation Week. The program includes general ability, achievement, and placement tests, orientation lectures, physical examinations; social events; special religious services; registration, and matriculation.

The University considers the planning of a course of study to be of primary importance. Perhaps the most significant moments of Orientation Week, therefore, are those which a new student spends with his faculty adviser. With the results of the tests available to them, the adviser and the student plan a course of study adapted to the ability, achievements, and goals of the individual student.

ENROLLMENT AND REGISTRATION: Students in residence are required to submit to the Dean of the College, not later than the date of the spring registration, cards showing their selection of courses for the following year. An advance deposit of $25.00 is required before the card may be submitted. These cards are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the time appointed must be readmitted to the College by reapplication to the Director of Admissions. Students whose course cards have been approved in the spring may enroll by mail during the summer. The same regulations, with the exception of the advance deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that prescribed in the calendar of this Bulletin must pay to the Treasurer a fee of $5.00. (See attendance regulations, page 54.) Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted late to any class without an enrollment card.

## *General Undergraduate Academic Regulations*

QUANTITY CREDIT AND COURSE LOAD: The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work. Two semesters of 17 weeks each

constitute the academic year. For the degree of Bachelor of Science in Engineering, credit for a minimum of 142 semester hours is required.

In engineering the normal load is 16-19 semester hours, exclusive of physical education. No student is permitted to take less than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than C.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are earned by a student on the basis of his grades: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION: To continue in college and to graduate, a student must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours and achieve a specified quality point ratio. The quality point ratio is based solely on work performed at Duke and is calculated by dividing the total number of quality points earned by the total number of semester hours attempted at Duke. These requirements are listed in the following table:

| *For continuation from* | *The minimum requirement is* |
|---|---|
| The first to the second year | 18 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 48 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 78 s.h. credit and a q.p.r. of 1.70 |
| The fourth to fifth year, if needed | 108 s.h. credit and a q.p.r. of 1.80 |

*For graduation the minimum requirement is,*

142 s.h., a q.p.r. of 1.90
and a q.p.r. of 2.00 in senior work*

* A minimum average grade of C in all courses taken in the last year, combined with all courses designated for the senior year in the particular engineering curriculum.

REPORTS: Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semester. In addition, six-weeks advisory grade reports on freshmen are mailed at each mid-semester period.

DISMISSAL: In addition to the qualitative standards listed above, students must pass a minimum number of hours each semester. Freshmen must pass at least 6 semester hours of work in their first semester, 3 required courses in their second semester, and 18 semester hours in their first year; all other students must pass at least 9 semester hours

each semester. Physical education credits are excluded in each case. The University may require a student whose record is considered unsatisfactory to withdraw although he has met the minimum requirements set forth in this paragraph.

ACADEMIC CLASS STANDING: *To be classified as a sophomore,* a student must have to his credit at least 22 semester hours and must have passed certain specially designated courses of the freshman engineering curriculum. *To be classified as a junior,* he must have to his credit at least 62 semester hours and must have passed certain specially designated courses of the sophomore departmental engineering curriculum. *To be classified as a senior,* he must have to his credit at least 102 semester hours and must have passed certain specially designated courses of the junior departmental engineering curriculum.

RESIDENCE REQUIREMENT: A minimum of 60 semester hours, including 30 semester hours from those hours normally taken during the senior year, must be earned in residence.

## *Grading, Examinations, and Attendance*

GRADING: Final grades are reported to indicate passing or failing work in designated courses. Final grades are:

(1) *Passing.* Passing grades are A, exceptional; B, superior; C, average; and D, low pass.

(2) *Failing.* A grade of F indicates that the student has failed the courses and to receive credit for the course he must repeat the work in class.

Special symbols are used to indicate the following:

(1) *Absence from the final examination.* In all cases in which the student is absent from a final examination, he receives an X in place of a final grade. If he does not present an acceptable explanation for his absence to the Dean's office within 48 hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of $5.00 to the Treasurer of the University. The instructor concerned arranges for the examination in cases where absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

(2) *Incomplete work.* If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed

before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be repeated in class if the student is to receive credit for it. In case a student whose work is incomplete is also absent from a final examination, he receives an X for the course.

(3) *Withdrawal.* The letter W is used to indicate official withdrawal from a course. If a student drops a course without permission from the Dean, the grade for that course is recorded as F. If he drops with permission a course in which he is failing, the grade for that course is recorded as F unless, in the judgment of the Dean, circumstances do not justify this penalty.

EXAMINATIONS: Final examinations are held in all subjects in January and May.

ATTENDANCE REGULATIONS: The attendance regulations specifically place the responsibility for class attendance upon the individual student. A student is expected to attend his classes regularly and punctually. It should be recognized that one of the most vital aspects of a residential college experience is attendance in the classroom, and that the value of this academic experience cannot be fully measured by testing procedures alone. The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance; and, conversely, to recognize and accept the consequences of failure to attend. Instructors are privileged to refer to the dean for appropriate action any student who in their opinion is causing his work or that of the class to suffer because of absences or latenesses.

Because there may be a concentration of pressures on members of the student body to extend holiday periods, and because severely limited attendance may be detrimental to the conduct of the class as a whole, the following severe sanction is imposed for unexcused absences immediately before or after a holiday period: *Any unexcused absence of a student on his last class day before or his first class day after an official holiday period shall result in suspension from the University.* This suspension shall be immediate except when the absence is before or after the Christmas holidays, in which case the suspension will not take effect until the end of the fall semester. The student may apply for readmission for the semester following suspension. No instructor has the authority to waive these regulations.

The summer recess and the period between semesters is not a "holiday period" within the meaning of this regulation. In order to ensure the orderly beginning of classes and to make class spaces available to students who are in residence, the following regulations apply: Registration in a course shall be forfeited if a student does not attend

the first meeting of the class and the space so vacated will be made available to another student. If a student whose absence has not been excused returns within the first week of school, he must re-register for his courses. A student who returns after the first week may not enroll that semester and will be required to apply for re-admission.

Absences from required classes due to illness will be excused when certified by a proper medical official. Absences from required classes due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the appropriate dean's office forty-eight hours in advance of the hour when their absences are to commence.

# Graduate Registration and Academic Regulations

WHO MUST REGISTER: (1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in *in absentia* status; (4) all students who wish merely to audit a course or courses.

REGISTRATION: After the applicant has received notification of his admission to the Graduate School and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the *Bulletin,* he first confers with the Director of Graduate Studies of his major department, who prepares a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. *Former students* who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

LATE REGISTRATION: All students are expected to register or pre-register at the time stated in the *Bulletin.* Those registering late are subject to a *late registration fee of five dollars.*

CHANGE OF REGISTRATION: During the academic year within a period of *fourteen days* from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean.

## *General Graduate Academic Regulations*

CREDITS. Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guid-

ance, academic progress in the United States is generally measured and recorded in terms of course hours and credits. Peculiar to graduate study is the term *residence,* also generally measured in hours, to designate individual study apart from courses, such as writing a thesis and preparing for general examinations. In this Graduate School credit for courses and seminars, research, and residence, and corresponding tuition and fees has been stated in terms of UNITS. According to conventional measurement ONE UNIT is equivalent to ONE SEMESTER HOUR.

CREDITS EARNED OUTSIDE THIS GRADUATE SCHOOL.

(1) *Graduate Credit Earned before the Bachelor's Degree Is Granted.* Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his A.B. or B.S. degree. However, an undergraduate student at Duke University who, at the beginning of his final semester, lacks no more than 9 semester hours of fulfilling the requirements for the A.B. or B.S. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to 15 semester hours a week. Such graduate courses will be credited toward the M.S. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of that term.

(2) *Transfer of Graduate Credits.* Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the student should file a request that his credits be reviewed and a decision made.

(3) *Reciprocal Agreement with the Consolidated University of North Carolina.* Under a plan of co-operation between the Consolidated University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the Consolidated University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the Consolidated University of North Carolina. On an experimental basis, a similar arrangement is in effect in the Summer Session. See *Summer Session Bulletin* for terms of this arrangement.

GRADES. Grades in the Graduate School are as follows: *E, G, S, F,* and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below

passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, for a satisfactory reason, at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, the grade of F is entered upon the student's record unless his appeal to the Dean for the grade of *no credit* is approved. The grade of Z indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of *F* in a major course normally occasions withdrawal from a degree program; a grade of *F* in a minor course occasions academic probation.

COURSES PRIMARILY FOR UNDERGRADUATES. Students granted provisional admission and others whose preparation is found deficient may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses outside the major department may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Directors of Graduate Studies in the major department and in the department in which the course is listed and the supervisor of the program.

NORMAL REGISTRATION. A graduate student is designated as fully registered when he registers for the maximum credit his program requires. Required registration is set in consideration of the student's obligation to teach or assist and the stage he has reached in completion of degree requirements. Normal registration for the resident student who does not hold an appointment as part-time instructor or assistant is 15 units a semester or 30 units an academic year. The normal registration for the student who holds such an appointment is either 12 units or a minimum of 9 depending upon the number of hours a week he is required to teach or assist.

The resident student in a terminal master's program which requires no thesis carries normal registration until he has met all degree requirements. If a thesis is required and the student has met all requirements except for submitting his thesis, he registers for 3 units a semester while in residence or, if he elects to go out of residence, for 1 unit *in absentia* (a semester) until the thesis is accepted.

The resident student engaged in a master's program which is not terminal but preparatory to a doctoral program registers as though he were a doctoral student.

The resident student in a doctoral program carries normal registration through the semester in which he passes the preliminary examination. Thereafter until the dissertation is accepted he registers for a minimum of 3 units a semester. If he elects at any time to go out of residence, to keep his program active he registers for 1 unit a semester *in absentia*.

The registration of 1 unit a semester *in absentia* is not considered full registration and does not provide access to library carrel, laboratory space, or Student Health but does permit occasional consultation with the thesis or dissertation supervisor. It may be waived for military duty or serious problems of health. Master's candidates subject to the fee for submitting a thesis in the academic year may credit the 1-unit fee to this charge.

In the Summer Session 6 units a term is maximum registration. Students resident in the academic year who wish to continue study and use of University facilities including Summer Session Student Health during the summer must register for 1 unit in the first Summer Session term. This registration provides use of these facilities for both terms.

TRANSCRIPT. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Central Records Office.

SIZE OF CLASSES. Classes which carry graduate credit are limited in size to 30 students. In exceptional cases this regulation may be modified, but only by permission of the Executive Committee of the Graduate School Faculty on the recommendation of the department concerned. When courses numbered 200 to 299 carry graduate credit, they may include no more than three juniors and such juniors must, at the time of registration, have an over-all B average.

## *The Master of Science Degree*

The degree of Master of Science (M.S.) is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completd a minimum of 12 semester hours work in the major field.

The M.S. program is designed to provide breadth of background in the science of engineering with particular reference to the major field. Requirements for this degree comprise: major and minor courses, a thesis, and a final examination. There is no foreign language requirement.

MAJOR AND MINOR COURSES. Course requirements are a minimum of 12 units of graduate course credit in the major subject area, 6 units in related minor work outside of engineering, and 6 units in either major or minor area.

THE THESIS. The M.S. thesis should demonstrate the student's ability to investigate and report in a scholarly manner on a research problem in his major field.

THE EXAMINATION. The candidate for the M.S. degree must appear before an examining committee for an examination on the subject matter of his thesis and his major field.

TIME LIMIT. The M.S. degree candidate who is in residence for consecutive academic years should complete all requirements within two calendar years of his first registration. Any candidate must complete all requirements within six calendar years of his first registration.

## *The Doctor of Philosophy Degree*

The degree of Doctor of Philosophy (Ph.D.) is offered in the field of Electrical Engineering. Although course work is a necessary part of a doctoral program, the granting of the Ph.D. degree is based primarily on the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research in that field. Formal requirements for this degree are: foreign languages; major and minor course work; supervisory committee; residence; preliminary examination; dissertation; final examination. Candidacy for this degree can be established only if all course work of the first year of graduate study has been passed, at least 9 units of it with a grade of G or better.

FOREIGN LANGUAGES. A demonstrated mastery of two foreign languages, normally French and German, is a requirement for the Ph.D. degree. Substitution of another language bearing a relation to the program of work may be made with the approval of the Dean of the Graduate School. The language requirement may be met either by proper transcript or by examination.

MAJOR AND MINOR SUBJECTS. The program of study for the Ph.D. degree must include a minimum of 24 units of graduate course work in the major department and a minimum of 24 units of minor course work, normally in mathematics and physics or chemistry.

SUPERVISORY COMMITTEE. Upon recommendation of the Director of Graduate Studies of the major department, the Dean of the Graduate School appoints a supervisory committee of at least five members to formulate the student's program of study and to serve as the examining committee for both the preliminary and the final Ph.D.

examinations. The instructor who is to direct the student's research serves on this committee as its chairman.

RESIDENCE. The minimum requirement for the Ph.D. degree is 60 units of graduate credit: 48 units of course work and 12 units of dissertation credit. Not more than 30 units of credit may be accepted by transfer. Since a full program is 30 units per academic year, a candidate who enters with the Bachelor's degree must expect to spend in residence a *minimum* of two academic years, and a candidate who enters with the Master's degree must expect to spend in residence a *minimum* of one academic year. The student's supervisory committee will determine what residence requirements, if any, must be met above the minimum.

PRELIMINARY EXAMINATION. A student is accepted as a candidate for the Ph.D. degree only after he has passed a preliminary examination at this Graduate School. This examination ordinarily covers both the major and minor fields, and normally is taken by the end of the second year of resident graduate work.

THE DISSERTATION. The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research. It is expected that the dissertation will be submitted and accepted within two calendar years of passing the preliminary examination. If acceptance of the dissertation has not been accomplished within four calendar years of the preliminary examination, an extension of no more than one calendar year may be granted by the Dean of the Graduate School upon petition of the candidate.

FINAL EXAMINATION. The final requirement for the Ph.D. degree is the passing of an oral examination which is based primarily on the dissertation but may involve the candidate's major field. If a student fails his final examination, he may be granted only one re-examination. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

# Honors, Prizes, Activities

## *Undergraduate Honors*

### GRADUATION WITH HONORS

To be eligible for Honors, a student must earn, during the year, credit for at least the minimum academic load permitted by the College. All semester hours on which a student receives a grade are counted in the determination of Honors. Students in the freshman, sophomore, and junior classes who earn an average of at least 3.50 quality points per semester hour are given Honors.

Students who have completed a minimum in residence of 90 semester hours in Duke University are eligible for general Honors at graduation. Those who earn an average of at least 3.50 quality points per semester hour are recommended for a degree *magna cum laude.* Those who earn an average of at least 3.75 quality points per semester hour are recommended for a degree *summa cum laude.*

### GRADUATION WITH DEPARTMENTAL DISTINCTION

Graduation with Distinction in Civil, Electrical, or Mechanical Engineering is awarded to the student who, in the opinion of the department and of a special committee of the faculty, has demonstrated exceptional achievement in the area of his special interest.

### HONORS-MASTERS PROGRAM

(See *Bulletin of Undergraduate Instruction* for description.)

## *Prizes*

*The Tau Beta Pi Prize:* The North Carolina Gamma Chapter of Tau Beta Pi, engineering national honor society, awards each year a suitable prize, such as an engineering handbook, to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

*The American Society of Civil Engineers Prize:* Consists of a certificate of award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the Student Chapter, and his participation in other college activities and organizations.

*The George Sherrerd III Memorial Award in Electrical Engineering* was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. This award, consisting of the income from a fund of $5000.00, is made annually to that senior student in Electrical Engineering who, in the opinion of the Electrical Engineering faculty, has attained the highest level scholastic achievement in all subjects and simul-

taneously has rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

*The Charles Ernest Seager Memorial Award,* established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the Institute of Electrical and Electronics Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

*The Milmow Prize:* Consists of a certificate of award and a one year's payment of dues in the Institute of Electrical and Electronics Engineers for the membership year in which the honoree is awarded his baccalaureate dgeree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department and as shown by his grades, has made the most progress in electrical engineering during his last year in college.

*Julia Dale Prize in Mathematics:* A prize of books given annually to the undergraduate who shows the greatest proficiency in the study of the calculus.

*The William Senhauser Prize:* Given by the mother of William Senhauser in memory of her son, a member of the class of 1942, who lost his life in the Pacific Theatre of War on August 4, 1944. The award is made annually to the sophomore or junior in Trinity College or the College of Engineering who has made the greatest contribution through participation and leadership in intramural sports. The winner of this prize is chosen by a committee selected by the President of the University.

# *Activities*

## STUDENT BRANCHES OF ENGINEERING PROFESSIONAL SOCIETIES

The three Departments of the College of Engineering support student branches of the following national professional engineering societies:

*American Society of Civil Engineers, American Society of Mechanical Engineers, Institute of Electrical and Electronics Engineers.*

## ENGINEERS' STUDENT COUNCIL

The Engineers' Student Council, composed of approximately 20 members from the various organizations and classes in the engineering student body, coordinates the activities of all student organizations in the College. The Council acts to represent the interests of the students in their relationships with the public, the faculty, and the administration. The Council is responsible for such activities as the Engineers' Show, homecoming displays, supervision of the student Lounge, social events, and the Engineers' Guidance Council.

## ENGINEERING STUDENT PUBLICATION

*The DukEngineer,* official student-published magazine of the College, which appears twice each semester, contains articles on technical and semi-technical topics and other matters of interest in the College.

## ENGINEERS' RADIO ASSOCIATION

Membership in the Engineers' Radio Association is open to all students of the College of Engineering who have an interest in amateur radio. The Association operates amateur radio station W4AHY and conducts code and theory classes for members who desire to obtain a Federal Communications Commission license.

## ENGINEERING LECTURE SERIES

In addition to his participation in the student branches of the national professional engineering societies, the student has the opportunity of additional development through the *Engineering Lecture Series*. The general function of the series is to provide stimulating lectures by outstanding members of the engineering profession.

### GENERAL ACTIVITIES OPEN TO ENGINEERS

As part of the University Community, students in the engineering programs share in all activities open to students.

## ENGINEERING HONOR SOCIETIES

*Tau Beta Pi*—engineering national honor society—Gamma Chapter of North Carolina.

*Delta Chi Epsilon*—civil engineering honor society.

*Eta Kappa Nu*—electrical engineering national honor society—Delta Lambda Chapter.

*Pi Tau Sigma*—mechanical engineering national honor society—Pi Iota Chapter.

*Order of St. Patrick*—honor society recognizing leadership in engineering student activities.

### GENERAL HONOR SOCIETIES

In addition to the national engineering student honor societies, students of the College are eligible for membership in the national and local honor societies throughout the campus.

# Supporting Staff

## PART-TIME INSTRUCTORS

Robert Newell Alexander (1962), B.S. in M.E. (Texas Technological College), *Mechanical Engineering*

Paul Robert Bengel (1963), B.S. in M.E. (Duke), *Mechanical Engineering*

Louis Bowles Bresee, Jr. (1962), B.S. in M.E. (Duke) *Mechanical Engineering*

Richard Wilcox Burow (1962), B.S. (Illinois Wesleyan), B.S. in M.E. (Duke), *Mechanical Engineering*

William Forrest Chambers (1962), M.S.E.E. (Stanford), *Electrical Engineering*

Chang N. Chen (1963), B.S. in C.E., (Cheng Kung), *Civil Engineering*

James Edward Hall (1963), B.S.E.E. (Duke), *Electrical Engineering*

Joseph Marvin Hunt, III (1963), M.S. (North Carolina State), *Electrical Engineering*

David Teh-yu Kao (1963), B.S. in C.E. (Cheng Kung), *Civil Engineering*

William Turner Kendrick (1962), B.S. in M.E. (Virginia), *Mechanical Engineering*

Jean-Pierre Georges LeFloch (1962), Ing. Dipl. (Ecole Superior d'Electricite), *Electrical Engineering*

Charles A. Moore, Jr. (1962), B.S. in C.E. (Duke), *Civil Engineering*

Norman Lee Owsley (1963), B.S.E.E. (Lehigh), *Electrical Engineering*

Surendra Kumar Saxena (1963), B.S. in C.E. (Muslim), *Civil Engineering*

George Joseph Titus (1963), B.Sc. (Kerala), B.M.E. (Gannon), *Mechanical Engineering*

Yuan Yu (1961), B.S.E.E. (National Taiwan University), *Electrical Engineering*

## SUPERVISED TEACHING INTERNS

Peter Edward Jackson (1962), B.S.E.E. (Duke), *Electrical Engineering*

David Frank Palmer (1963), M.S. (New Mexico), *Electrical Engineering*

## GRADUATE ASSISTANT

Yung-ming Feng (1963), B.S.E.E. (National Taiwan University), *Electrical Engineering*

## RESEARCH ASSOCIATES

Michael Stephen Patrick Lucas (1959), M.S. (Duke), *Electrical Engineering*

Edward Towson Moore (1961), Ph.D. (Duke), *Electrical Engineering*

James Joseph Murray (1960), M.S. (Chicago), *Electrical Engineering*

Albert Parker Sheppard (1963), M.S. (Emory), *Electrical Engineering*

Wilber Clarence Stewart (1958), M.S. (Duke), *Electrical Engineering*

Franz K. Weddeling (1958), Dipl. Phys., Dr. Ing., *Mechanical Engineering*

## RESEARCH ASSISTANTS

Ihsan M. H. Bábaá (1961), B.S.E.E. (Illinois Institute of Technology), *Electrical Engineering*

William Wei-li Lee (1962), B.S. in C.E. (National Taiwan), *Civil Engineering*

Donald Theodore Meyer (1961), M.A. (Duke), *Electrical Engineering*

Jai Raj Narain Rajan (1960), B.S. in C.E., M.S. (Duke), *Civil Engineering*

Frank Thomas Wooten, III (1959), B.S.E.E. (Duke), *Electrical Engineering*

## FELLOWS

Richard Gaylen Absher, M.S.E.E. (New Mexico), *James B. Duke Fellow, Electrical Engineering*

Charles Lowe Rogers M.S.E.E. (Auburn), *National Science Foundation Fellow, Electrical Engineering*

Candler Arthur Willis, Jr., B.S. (North Carolina State), *Shell Foundation Fellow, Electrical Engineering*

## CLERICAL AND TECHNICAL

Lester Barham, *Laboratory Technician in Electrical Engineering*

Mrs. Leon S. Brooks, *Secretary, Electrical Engineering Department*

Mrs. S. G. Buchanan, *Secretary, Dean's Office*

Mrs. Winston E. Crabtree, *Secretary, Mechanical Engineering Department*

William Glenwood Clayton, *Laboratory Technician in Mechanical Engineering*

Joseph, Philip Edwards, *Supervisor of Engineering Services, Electrical Engineering Department*

Mrs. Gelene Faucette, *Secretary, Civil Engineering Department*

James Edgar Grasty, *Technician Assistant in Mechanical Engineering*

Mrs. Dorothy Holt McElduff, A.B., *Recorder and Secretary to the Dean*

Mrs. George F. Kale, *Librarian*

Marvin Primro King, *Assistant Mechanic in Civil Engineering*

William Thomas Lessig, *Engineering Illustrator*

Mrs. Richard Prince, A.B., M.R.E., *Assistant Librarian*

Mrs. Anna P. Stoner, *Secretary, Dean's Office*

Mrs. Frank W. Stout, *Secretary, Civil Engineering Department*

Miss Judith G. Tunstall, *Secretary, Electrical Engineering Department*

Alonzo George Vaughn, *Laboratory Mechanic in Civil Engineering*

## ENGINEERING FACULTY COUNCIL

*Chairman:* Dean J. L. Meriam
*Secretary:* E. B. Weatherspoon
*Civil Engineering:* E. I. Brown, II, K. P. Arges
*Electrical Engineering:* C. R. Vail, T. G. Wilson
*Mechanical Engineering:* J. N. Macduff, C. M. Harman
*English:* G. C. Harwell
*History:* T. Ropp
*Mathematics:* F. G. Dressel
*General Administrator:* Provost R. T. Cole, H. W. Lewis
*Ex-Officio:* R. L. Dickens, *Assistant Dean of Arts and Sciences;* E. K. Kraybill, *Assistant Dean of Engineering*

## FACULTY COMMITTEES

*Bulletin:* Kraybill; Brown, Harwell, Nash, Vail
*Engineering Publications Advisory:* Harman; Harwell, Olive, Wood
*Executive:* Meriam; Brown, Kraybill, Macduff, Vail, Wilson
*Freshman Advisory:* Kraybill; Artley, Bresee, Haines, Jones, Lewis, Sheppard, Williams, Wilson
*Library:* Bryan; Kale, Kenyon, Koepsel
*Schedule:* Kraybill; Macduff, McElduff, Meier, Williams
*Educational Facilities:* Meriam; Brown, Kraybill, Macduff, Vail
*Academic Planning:* Wilson; Church, Harman, Harrawood, Hill, Owen
*Displays:* Wood; Jones, Nash
*Guest Speaker Program:* Church; Brown, Harman, Wilson

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# BULLETIN
## OF
# DUKE UNIVERSITY




## Undergraduate Instruction

(Trinity College, the Woman's College, and the College of Engineering)

ANNOUNCEMENTS FOR 1964-65

VOLUME 36 March, 1964 NUMBER 5

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C. 27706

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N. C. 27706

For Bulletin of Engineering, apply to *The Registrar,* Duke University, Durham, N. C. 27706

For Bulletin of The Divinity School, apply to *The Dean of the Divinity School,* Duke University, Durham, N. C. 27706

For Bulletin of The School of Forestry, apply to *The Dean of the School of Forestry,* Duke University, Durham, N. C. 27706

For Bulletin of The Graduate School of Arts and Sciences, apply to *The Dean of the Graduate School,* Duke University, Durham, N. C. 27706

For Bulletin of The School of Law, apply to *The Dean of the School of Law,* Duke University, Durham, N. C. 27706

For Bulletin of The School of Medicine, apply to *The Dean of the School of Medicine,* Duke University, Durham, N. C. 27706

For Bulletin of The School of Nursing, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C. 27706

For Bulletin of The Summer Session, apply to *The Director of the Summer Session,* Duke University, Durham, N. C. 27706

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# BULLETIN

OF

# DUKE UNIVERSITY

## THE UNDERGRADUATE COLLEGES

TRINITY COLLEGE
THE WOMAN'S COLLEGE
THE COLLEGE OF ENGINEERING

ANNOUNCEMENTS FOR 1964-1965

DURHAM, NORTH CAROLINA
1964

# General University Administration

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*President of the University*

Robert Taylor Cole, Ph.D.
*Provost*

Gerhard Chester Henricksen, M.A., C.P.A.
*Vice President for Business and Finance and Treasurer*

Everett Harold Hopkins, Ph.D.
*Vice President for Planning and Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B.
*Vice President for Institutional Advancement and Assistant Provost*

Charles Edward Jordan, A.B., LL.D.
*Vice President for University Relations*

Herbert James Herring, A.M., LL.D.
*Vice President for Student Life*

Frank Traver de Vyver, Ph.D
*Vice Provost*

Harold Walter Lewis, Ph.D.
*Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D.
*Dean of the Medical School and Vice Provost*

Benjamin Edward Powell, Ph.D.
*Librarian*

Richard Lovejoy Tuthill, Ed.D.
*University Registrar*

Craufurd David Goodwin, Ph.D.
*Secretary*

Edwin Constant Bryson, LL.B.
*University Counsel*

## UNDERGRADUATE ADMINISTRATION

Mary Margaret Ball
*Dean of the Woman's College*

Alan Krebs Manchester, Ph.D.
*Dean of Trinity College*

James Lathrop Meriam, Ph.D.
*Dean of the College of Engineering*

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# 1964

### JULY

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# Calendar of the Colleges 1964-65

## 1964

| | | |
|---|---|---|
| September | 17 | Thursday. 7:30 p.m. Orientation Begins: Assemblies for all new students entering Trinity College, the Woman's College, and the College of Engineering. |
| September | 21 | Monday. Registration and matriculation of all students of Trinity College, the Woman's College, and the College of Engineering who have not pre-registered. |
| September | 23 | Wednesday. Final registration of pre-registered students. |
| September | 24 | Thursday. Fall semester classes begin. |
| November | 7 | Saturday. Last Day for reporting six-weeks grades. |
| November | 12-15 | Pre-registration for Spring Semester 1965. |
| November | 25 | Wednesday. 12:30 p.m. Thanksgiving recess begins. |
| November | 30 | Monday. 8:00 a.m. Classes are resumed. |
| December | 11 | Friday. Founders' Day. |
| December | 19 | Saturday. 12:30 p.m. Christmas recess begins. |

## 1965

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| January | 4 | Monday. 8:00 a.m. Classes are resumed. |
| January | 16 | Saturday. 12:30 p.m. Fall semester classes end. |
| January | 19 | Tuesday. Final examinations begin. |
| January | 29 | Friday. Final examinations end. |
| February | 2 | Tuesday. Registration and matriculation of new undergraduate students. |
| February | 3 | Wednesday. Last day for matriculation for the Spring Semester. |
| February | 4 | Thursday. Spring Semester classes begin. |
| March | 17 | Wednesday. Last day for reporting six-weeks grades. |
| March | 27 | Saturday. 12:30 p.m. Spring recess begins. |
| April | 5 | Monday. 8:00 a.m. Classes are resumed. |
| April | 6-9 | Pre-registration for Summer Session and Fall of 1965. |
| May | 20 | Thursday. 5:00 p.m. Spring Semester classes end. |
| May | 22 | Saturday. Final examinations begin. |
| June | 2 | Wednesday. Final examinations end. |
| June | 5 | Saturday. Commencement begins. |
| June | 6 | Sunday. Commencement Sermon. |
| June | 7 | Monday. Graduating Exercises. |

# Admission

NEW STUDENTS are admitted for the academic year at the opening of school in the fall.

The size of the entering classes is approximately as follows: Trinity College, 500; Woman's College, 340; College of Engineering, 175; the School of Nursing, 95. Since five thousand candidates normally apply and enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the colleges offer. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Although there are no inflexible subject matter requirements, at least fifteen acceptable units of secondary school credit must be presented. Of these at least twelve must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board. Candidates applying to the College of Engineering must include the appropriate mathematics test.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

## *Early Decision Plan*

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on either October 15 or February 1 of the student's senior

year in secondary school. The deadline date for completing applications for October decision is September 15 and for February decision, January 1. Interested students should write to the Office of Admissions for detailed information.

## *Regular Admission*

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina, 27706. A non-refundable processing fee of $10.00 must accompany the submission of the full application form.

Candidates for admission to the School of Nursing should address their inquiries to the Dean of the School of Nursing, Hanes House, Duke University, Durham, N.C., 27706.

A candidate for admission who wishes to arrange an interview should do so through the Director of Admissions for the college or school concerned: the College of Engineering, Trinity College, the Woman's College, or the School of Nursing.

## *Admission to Advanced Standing*

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Office of Admissions, with a detailed account of their activities since withdrawal from college.

# Student Life and Services

## *The Libraries*

TO SUPPORT a rich educational experience in a world of rapid and far-reaching change, great library collections are essential. Undergraduate students at Duke are fortunate to have available exceptional resources. The University library, among the first sixteen university libraries in the country, contains 1,600,000 volumes and 3,000,000 manuscripts. About 50,000 volumes are added annually. Separate departmental and professional school libraries provide notable collections in the several disciplines.

The Woman's College library, with its own attractive Georgian building contains 140,000 volumes in an open stack collection, chiefly those books most frequently used in the undergraduate curricula. The larger collections of the main and specialized libraries are at hand when needed.

More detailed information may be obtained in a "Student's Guide to the General Library," available on request to the Librarian of the University.

## *Residence Halls*

As the undergraduate colleges of the University are resident institutions, all students are required to live in the residence halls. Any exception must be approved by the Dean of Men or the Dean of Women. Men students are assigned quarters on the West Campus, women on the East.

Detailed information concerning the student's obligations under the housing contract is sent to the men students by the University Housing Bureau upon their admission to the College. This information for women students is published in the Woman's College Handbook.

On the West Campus, Craven, Crowell, Few, and Kilgo quadrangles and Wannamaker Hall are occupied by undergraduate men. The houses in Kilgo and part of Crowell are reserved for members of the freshman classes of Trinity College and the College of Engineering, and each has a resident Head Housemaster and one or more Housemasters. A limited number of freshmen also reside in other houses where they live in community with upperclass students and a

Fellow, a faculty member or advanced graduate student who serves as their adviser.

On the East or Woman's College Campus all residence houses—Addoms, Alspaugh, Aycock, Bassett, Brown, Gilbert, Giles, Jarvis, Pegram, and Southgate—have both single and double rooms. These houses are alike in their organization. In each of them there is a resident House Counselor, who is a member of the Dean's staff, and full representation from all four classes, the appropriate number of places being reserved each year for freshmen.

## *Medical Care*

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester, and in the fees charged each student in the summer quarter.

The Service is under the direction of the University Physician with the cooperation of the Staff. It includes hospitalization in Duke Hospital, as deemed necessary by the Hospital Staff, but limited to thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Special nursing is not covered. Students pay for board while in the hospital. Refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernias, pilonidal cysts and other elective surgery, chronic skin conditions, endocrine disturbances, etc., are not included. The cost of any necessary braces and orthopedic appliances, and special nursing, must be borne by the students. Blood used for transfusions must be paid for or replaced.

If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. Accidents or illnesses occurring during vacations or while off the campus are not included in this service. A special commercial policy available only to regularly enrolled Duke students furnishes complementary protection, if desired.

Advisory consultation with a psychiatrist at no expense is available to students through referral either by the Student Health Physicians or by the Deans, but office visits for psychotherapeutic interviews are not included in this service.

A woman physician is in charge and a nurse in constant attendance at the Woman's College Infirmary. Women students receive ambulant care at regular office hours, and patients in this Infirmary can be transferred to the Duke Hospital at any hour of the day or night.

Male students receive ambulant care at the Student Health Office

in the hospital during regular office hours. The emergency service and the specialist consulting services of the Hospital and Medical School are always available.

Students are given careful physical examinations upon arrival at the University. Every applicant should be re-vaccinated against smallpox within three years before admission to the University. It is urgently advised that an oral vaccine routine for poliomyelitis be completed by all students and that all male undergraduates be actively immunized to tetanus by injections of toxoid.

Simple directions for procedure in reporting the students' needs for medical care are contained in the Student Handbook supplied to each student upon entering.

## *Special Services*

Other services of many kinds are available to all undergraduate students. Among these may be cited the educational, personal, and vocational counseling provided through the Bureau of Testing and Guidance. Through the Appointments Office, undergraduates are assisted in their search both for summer employment and post-graduation positions.

## *Physical Education*

Students of Trinity College and the College of Engineering who have no restrictive physical handicap must enroll in a physical education class each of four semesters. The first two of these four consists of prescribed activities designed to improve body control, growth and development through big muscle exercises; the last two semesters may be devoted to activity of the individual's choice from a number of sports of a recreational nature, such as badminton, basketball, golf, handball, swimming, tennis, and volleyball. A total of four semester hours credit toward graduation and quality points according to the marks assigned are awarded for these activities. In instances where the University Health Service examination indicates that specific types of activity may be beneficial, a modified program is available as medically prescribed. Normal credit is awarded for participation in the modified program.

In addition to the four semesters of required physical education, each student may voluntarily participate in the intramural program, which includes a dozen sports and attracts a large percentage of the student body. In a typical year more than 3,000 students forming fraternity, dormitory, and organizational teams, participate in seventeen tournaments and compete for more than fifty trophies.

For each semester of undergraduate enrollment, the student is

issued a uniform appropriate for the season and the activity in which he is engaging. The uniform is issued, exchanged, laundered, and maintained at no additional expense to the student.

The physical education program in the Woman's College is designed to give the students an appreciation of the value of activity for general physical well-being, skill in one or more activities which can be enjoyed as recreation during and after college, a well-developed and well-coordinated body, and a knowledge of good posture. To this end, students are allowed to choose from a large number of activities, including individual, dual and team sports, swimming, and several types of dancing. Each student during her two years of required physical education must elect one course in dance. Students who are unable to pass the swimming test must elect one course in swimming. Students whose test scores indicate special needs must elect a course in fundamentals of movement, rhythm, sports, or posture during the first half-semester.

Within the Woman's Recreation Association various clubs including Terpsichorean (modern dance), Nereidian (water ballet), and other sports groups offer opportunities for each student to take part in the various extra-curricular activities most interesting to her. The swimming pool, tennis courts, bowling alleys, and other athletic facilities are available to all students for use at specified times.

In order to maintain certain hygienic standards of physical education and intramural athletics, the University has made available for all students, in addition to facilities for physical activity and recreation, the following equipment and services:

1. Gym suit, dance leotard, bathing suit, warm-up suit.
2. Provision for locker and handling of uniform.
3. The laundering of uniforms and towel as needed.

## THE INTERCOLLEGIATE ATHLETIC PROGRAM FOR MEN

The program, controlled entirely by the University, consists of the organization and training of representative freshman and varsity teams in football, baseball, basketball, track, cross country, golf, lacrosse, soccer, swimming, tennis, and wrestling. In addition to these intercollegiate sports an informal fencing program is sponsored by the University.

The program is under the supervision of the Athletic Council, composed of seven members. Three of the seven are appointed by the President of the University from the faculty as follows: one member from the Officers of General Administration, one from the Officers of Educational Administration, division of the Colleges, and one from the Officers of Instruction of the undergraduate colleges. From this

group the President of the University appoints the faculty chairman, who serves as chairman of the Athletic Council and of its executive committee.

Four of the seven members are selected from the alumni. One of the four, a University Trustee, an alumnus, and a member of the Board's standing Committee on Physical Education and Athletics, is appointed not less frequently than every three years by the chairman of the Board of Trustees. The remaining three, who may not succeed themselves, are elected annually by the general Alumni Association for terms of three years. The Director of Alumni Affairs serves *ex officio* as secretary of the Council and of the executive committee.

The three faculty members of the Athletic Council constitute a committee which has the responsibility of enforcing the scholarship and athletic requirements of the University for participation in intercollegiate sports. The athletic eligibility rules are those of the Atlantic Coast Conference.

The executive committee of the Athletic Council is composed of the faculty chairman of the Council, one other faculty member of the Council and one alumni member of the Council. The executive committee of the Council recommends to the President of the University persons to serve as Director of Athletics and as coaches in the various sports. The election of such persons, however, rests solely with the Board of Trustees of the University or with its Executive Committee on recommendation of the President of the University. The Director of Athletics recommends to the Athletic Council athletic schedules and the award of insignia of merit earned by members of the athletic teams. These decisions are the responsibility of the Athletic Council subject to approval of the President.

Each of the four undergraduate classes selects annually, for a term of one year, a member of each respective class to serve in an advisory capacity to the Athletic Council on the matter of awarding insignia of merit.

All funds from athletic events are handled entirely by the Treasurer of the University. An audit of the receipts and disbursements of these funds is made annually by the official auditors of the University and a report thereof made annually to the Executive Committee of the Board of Trustees.

## *Social and Cultural Organizations*

Although the campuses for men and women are geographically separated, extra-curricular life is in many respects coeducational. Each campus has its own Student Government Association, its own inter-social councils, and its own local and individual groups. In many areas all of these meet for inter-college life. The scope of these

more than one hundred separate student organizations fall into many broad interest areas, such as student government, service, professional and honorary, publications and radio, music, drama, and social.

In the area of government, in addition to the Student Government Associations, are the Pan-Hellenic and Interfraternity Councils, the Independent House Association, and the Social Standards Committee. The Student Union, Symposium Committee, and the YMCA and YWCA groups are primarily service organizations. The Professional and Honorary organizations are numerous and include traditional Greek letter societies, such as Phi Beta Kappa, as well as national and local academic and leadership groups.

The Duke Chronicle, the campus newspaper, is published twice a week, and the student radio station, WDBS, operates daily. Three magazines and a comprehensive yearbook are published by students. Student publications are under the control of the Publications Board, composed of six members from the University staff appointed by the President; six men from the Junior and Senior classes, elected by the students in Trinity College and the College of Engineering; four women from the Junior and Senior classes, elected by the students in the Woman's College; and one from the Junior and Senior classes, elected by the students in the School of Nursing; and four editors and four managers of student publications, *ex officio* members without voting power. No student publication can be established at the University without the approval of the Board.

The musical groups include the Chapel Choir, Symphony Orchestra, Concert Band, Glee Clubs, and several smaller groups. The Duke Players present a number of plays and readings each season. The Hoof 'n' Horn Club annually produces a musical comedy which is written, cast, directed, and acted by students from the three colleges.

Other campus groups, social in nature, sponsor dances, chaperoned cabin parties, concerts, and informal discussion groups. Social functions are frequent enough to afford the relaxation needed from work required in class room and laboratory.

Approximately half of the undergraduate students belong to fraternities and sororities. Although there are no chapter houses, the program of fraternity and sorority activity is carried on within the sections of the regular dormitories or buildings set aside for this purpose. Eighteen national social fraternities and thirteen national sororities have chapters on campus.

The Union Building, located on the West Campus, is the student center for coeducational activities. It houses, among other groups, the Student Union organization. This body is unique in its coeducational aspects, bringing the men and women together in the carrying out of its stated purpose, "to stimulate, promote, and develop the social, recreational, cultural, educational, and spiritual activities of

the students of Duke University." This purpose is carried out through a broad program including lectures, concerts, recreational activities, dances, exhibits, etc., adapted to the leisure time interests and needs of all students, who as undergraduate students are members of the Union.

In one section of the West Campus Union are housed the Alumni offices, dining facilities, University store, grill, soda fountain, post office, barber shop, bank, and ball room. Elsewhere in the building are student organization offices, meeting rooms, an information center, and music, reading, lounge and recreational areas. Many similar service and activity areas for the Woman's College are provided on that campus.

## *Religious Life*

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

In the University Service of Worship on Sunday morning two hundred students participate by singing in the choir; at least one hundred other students aid in special ways, as ushers, collectors, and assistants in the communion services.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and six denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts,

other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

## *Reserve Officers Training Corps*

Through the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in providing well-educated officers for the regular and reserve forces of the Nation.

THE NAVAL RESERVE OFFICERS TRAINING CORPS: There are two basic programs through which students can qualify for Naval commissions upon graduation; one, the Regular Naval Reserve Officers Training Corps program, which provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, which leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve.

The Regular Student—Quotas are awarded on the basis of an annual nation-wide test and selection procedure. Students selected are appointed Midshipmen, USNR, and receive four years tuition, fees, and textbooks at government expense plus retainer pay at the rate of $600 per year. The regular midshipman may take any course leading to a baccalaureate or higher degree with certain exceptions, e.g., pre-medicine and medicine, pre-theological and theological, music and art. His academic program must include 21 semester hours of Naval Science, 3 semester hours of General Psychology, one year of college physics and one year of college mathematics. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering Degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.), the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.). The Regular midshipman participates in two summer training cruises aboard ship and receives aviation and amphibious indoctrination at naval shore stations for one summer. Upon graduation he receives a commission as Ensign in the Regular Navy, or Second Lieutenant in the Regular Marine Corps, after which he serves with the Navy or Marine Corps, as required by the Secretary of the Navy in the same manner as his officer contemporaries who are graduates of the U. S. Naval Academy. The minimum period of commissioned service is four years for regular officers.

The Contract Student—The contract student is selected from those regularly enrolled in Duke University who desire to qualify for a commission in the Naval or Marine Corps Reserve while pursuing

normal courses of study. Since he will be ordered to three years active duty immediately on graduation and commissioning, the Navy does not recommend that a medical, dental or theological student apply for this program. He must include in his academic program mathematics through trigonometry (if not successfully completed in secondary school), or one semester of college mathematics, 3 semester hours of General Psychology, and 21 semester hours of Naval Science. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.) the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.). He has the status of a civilian who has entered into a mutual contract with the Navy and is not eligible for the benefits and retainer pay received by regular midshipmen. He is paid a subsistence allowance during his last two years in the NROTC, however, amounting to twenty-seven dollars a month. He goes aboard ship for one summer training cruise, normally between his junior and senior years. Upon graduation, he is commissioned in the Naval or Marine Corps Reserve and reports for a minimum of three years active duty. Upon completion of the minimum active service requirements he may request transfer to the regular component of the Navy or Marine Corps, retention on active duty as a reservist, or transfer to the inactive reserve.

Both Regular and Contract midshipmen are deferred from Selective Service by virtue of their commitment to serve on active duty after graduation. The Navy furnishes necessary uniforms and equipment. Uniforms are worn only on drill days or other special occasions when prescribed by the Professor of Naval Science. Regular and Contract students receive the same instruction and wear the same uniforms. No distinction is made between the two in the NROTC Unit. Contract students may compete each year for the Regular Program, and if selected, they will be appointed to Regular status with the subsequent benefits.

### THE AIR FORCE RESERVE OFFICERS TRAINING CORPS:

The unit functions as a regular department of instruction known as the Department of Air Science. It selects and trains students who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers.

For enrollment in the Basic Course (freshmen and sophomore years) the student must: be a male citizen of the United States; be physically qualified under standards prescribed by the Air Force (due allowance will be made for defects which are correctable prior to the student's eligibility for appointment as a commissioned officer); be accepted by the institution as a regularly enrolled student; be not

less than 14 years of age and not have reached 23 years of age at the time of enrollment; must successfully complete such general survey and screening tests as may be prescribed; and must sign a loyalty certificate with the U. S. Government. Students initially entering the University who have had previous preparatory or high school military training are normally accepted in Basic Air Science at the same academic level as that in which they are accepted by the University.

For enrollment in the Advanced Course (junior and senior years) the student must have successfully completed the Basic Course or have had at least one year of honorable service in the Armed Forces of the United States; must execute a written agreement with the government to complete the Advanced Course *and accept a commission in the United States Air Force Reserve,* contingent upon remaining in school, and to attend Advanced Summer Training at the time specified; must agree to take orientation flights when offered; must be less than 28 years of age at the time of graduation; must successfully complete such general survey and screening tests as may be prescribed and must be selected by the Professor of Air Science and the appropriate authority of the University.

Students in the Basic Course may be deferred from Selective Service upon satisfactory completion of one semester of Basic Air Science. Advanced students are deferred as soon as they are enrolled formally in the Advanced Course.

All uniforms, texts, and training equipment required for the Air Science Course are furnished at government expense, and students are paid a total of approximately $600.00 for the two years of the Advanced Course.

A thirty-five (35) hour Flight Instruction Program using light aircraft is restricted to seniors who may, upon completion of the course, qualify for a Civilian Private Pilots License. To participate in this program, Fourth Year Cadets must be physically and aptitudinally qualified for the Air Force Flight Instruction Program.

Upon graduation and completion of the Advanced Course, selected students for flying or line assignments will be offered commissions as Second Lieutenants in the Air Force Reserve. Reserve Officers who desire lifetime careers in the Regular Air Force may apply for regular commissions after serving on active duty for one year. An Air Science student who maintains a high academic and aptitudinal average is eligible for designation as a Distinguished AFROTC Cadet and later, a Distinguished AFROTC Graduate. A designee, if fully qualified, will receive a regular commission upon graduation.

# The Summer Session

THE SUMMER SESSION at Duke University makes available to Duke undergraduate students and to undergraduates from other universities and colleges a notable program of instruction in many fields of knowledge both academic and professional.

Undergraduates in Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two and one-half summer sessions.

Undergraduates from other colleges and universities may enjoy the special advantages of summer instruction at Duke and transfer their earned credits to their own institutions.

The Summer Session of 1963 will include two terms: Term I, June 11 to July 17; Term II, July 18 to August 23. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

Instruction of interest to undergraduates will be offered in the summer of 1963 in the following departments and colleges: Botany; Chemistry; Economics and Business Administration; Education; Nursing; Engineering; English; Forestry; French; Geology; German; Greek; Health and Physical Education; History; Latin and Roman Studies; Mathematics; Philosophy; Physics; Political Science; Psychology; Religion; Sociology; Spanish; and Zoology.

Distinctive features of Summer Session instruction are provided by the program in marine biology offered at the Duke Marine Laboratory, Beaufort, North Carolina, and by various conferences in several of the Departments.

While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program both athletic and social.

Undergraduates of Duke University, both men and women, who plan to attend the Summer Session should enroll with the Dean of their own college in Duke University. Undergraduates in other universities or colleges who seek transfer credits should apply directly to the Director of the Summer Session, Duke University, Durham, North Carolina.

## TUITION AND FEE RATES

*Effective September, 1965*

The tuition for all Undergraduate Colleges (Trinity, Engineering, Woman's College, and the School of Nursing) will be $625.00 for each semester beginning in the Fall Semester of 1965. The general fee is $93.50. Part time special students who register for no more than two courses with a maximum total credit of eight semester hours are charged a registration fee of $5.00 for each course and $42.00 for each semester hour. Full time employees of Duke University who are paid on a monthly basis and who register for one or two courses totalling not more than seven semester hours are charged $5.00 registration fee and $21.00 for each semester hour carried.

Full time students may audit courses without paying additional fees. Those who are registered for at least three semester hours and not more than eight will pay $21.00 for each audited course.

# Financial Information

THE prospective student who seeks the optimum opportunity in higher education will not be a bargain hunter. Certainly, some sound plan for paying the cost of college must be devised, but this plan should be formulated after the thoughtful selection of an institution has been made. No college or university can honestly say that an education at the college level is inexpensive. Most university people and the ever growing college alumni families across our nation, however, will reflect the feeling that the benefits derived from a college education constitute a handsome return on the dollars invested.

Each student going to college should analyze carefully his financial situation. In making such analysis it should be recognized that the primary responsibility for defraying the cost of an education lies with the student and his family. The typical college student can depend upon some contribution from his family's current income, a proportionate share of family savings, and anticipated income from summer employment. The number of years of study contemplated and the number of dependent children in the family should be considered in computing the funds which will be available in a particular year.

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

## ESTIMATED EXPENSES FOR AN ACADEMIC YEAR

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

| *Undergraduate Men* | | *Undergraduate Women* | |
|---|---|---|---|
| Tuition | $1,050.00 | $1,050.00 | |
| General Fee | 187.00 | 187.00 | |
| Room Rent | 250.00 | 275.00 | |
| Board | 500.00 | 450.00 (Cafeteria estimate) | (Board Rate) |
| Books and Supplies | 70.00 | 70.00 | |
| Miscellaneous Expenses | 443.00 | 443.00 (Moderate estimate) | (Moderate estimate) |
| Totals | $2,500.00 | $2,475.00 | |

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of $2,500.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

## *Tuition and Fees*

The tuition of $525.00 and the general fee of $93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

New students, on notification of acceptance, are required to pay a non-refundable first registration fee of $20.00 and to make a deposit of $50.00. The $50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, $25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining $25.00 as a continuing registration deposit. Arrangements for refund of the $25.00 room deposit are described in information furnished each resident student by the Housing Bureau. The $25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

Students who have been readmitted to the University after an absence of one or more semesters, on notification of readmission, are required to make the $50.00 room and registration deposits.

An Air Force ROTC deposit of $20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

## *Living Accommodations*

Rooms are rented for a period of not less than one semester. No refund will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

In the residence houses for undergraduate men the rental charge for a single room is $300.00 for the academic year or $150.00 for each semester. The rental charge for a double room is $500.00 for the

academic year or $250.00 for each occupant, or $125.00 per semester for each occupant.

In the residence houses for undergraduate women, the rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant, or $137.50 per semester for each occupant.

The dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room, where full meals and *a la carte* items are served. The cost for the academic year ranges from $450.00 upward depending on the taste of the individual.

On the Woman's College Campus, dining halls are located in the Woman's College Union and in Gilbert-Addoms residence hall. Resident women will board in these halls. The charge for board is $225.00 per semester, payable at the time of registration. There will be no board refund for withdrawal after six weeks from the beginning of class; a refund will be made on a pro rata basis for withdrawals occurring during the first six weeks.

Because of the large number served in the dining halls, it is not possible to arrange special diets for individual students.

## *Other Information*

In the regular academic year students who register for no more than two courses with a maximum credit of 8 semester hours are classified as special students. They are charged a registration fee of $5.00 for each course and $35.00 for each semester hour of course credit. Registration for 9 or more semester hours, or 3 or more courses, requires payment of full fees.

Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than 8 semester hours may audit other courses by payment of $15.00 for each course audited.

In order to encourage its employees in their professional and personal advancement, Duke University will permit full-time employees that are paid on a monthly basis to take one or two courses, but not more than seven semester hours and will charge $5.00 per course plus $15.00 per semester hour.

One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Treasurer for all indebtedness.

Bills may be sent to parents or guardians provided the Treasurer

has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

## *Financial Aid*

Duke University is interested in students with ability and ambition. It is the aim of the University Scholarship Committee and others affiliated with the Student Aid Program to provide, insofar as possible, the financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans and part-time employment.

In 1963-64 financial aid totaled $1,859,000. Of this amount $959,000 was allotted to 1,216 undergraduate students in the form of scholarships, grants-in-aid, and remissions of tuition; $500,000 in student loans, and approximately $400,000 through part-time employment on the campus and in the city of Durham and the surrounding area.

Freshmen students shared proportionately in this aid: 441 received awards totaling $335,686 in direct assistance not including loans or part-time employment.

SCHOLARSHIPS: All requests for applications for scholarships, grants-in-aid, industry scholarships or remissions of tuition should be addressed to the Office of Admissions, Duke University, Durham, North Carolina.

All candidates for scholarships and grants-in-aid must submit an official Application for Admission to the University and the Application for Scholarship to the office of Admissions. Scholarship candidates who desire to be considered for the maximum value of scholarships on the basis of financial circumstances are required to submit the "Parents' Confidential Statement" of the College Scholarship Service. The "Parents' Confidential Statement" may be obtained from high school principals or upon request from the Student Aid Office.

Scholarship candidates should initiate their applications during the fall semester of their senior year of study in secondary schools. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for scholarships and grants-in-aid.

Awards annually available to undergraduate students at Duke University fall into eight major categories. These are:

(1) *Angier B. Duke Memorial Scholarships:* Recipients of these awards are students whose superior records mark them as young men and young women who give outstanding promise of becoming leaders in their chosen fields of endeavor.

Number available: 31 for each Freshman class.
Value: $200.00 to $2,400.00 annually.

(2) *W. N. Reynolds Memorial Scholarships:* Recipients of these awards are students of outstanding ability, superior records and the promise of constructive leadership. In considering candidates for the awards, first consideration will be given to:

1. Children of employees of R. J. Reynolds Tobacco Company or any of its affiliates or subsidiaries.
2. Children of families residing in Forsyth County, North Carolina.
3. Other candidates who are residents or natives of North Carolina.

(3) *Duke University School of Nursing Scholarships:* Recipients of these awards are young women whose superior records indicate outstanding promise of becoming leaders in the profession of Nursing.

Number available: 11 for each Freshman class.
Value: $200 to $1,200.00 annually.

(4) *Huguenot Scholarship:* A scholarship of $1,000.00 per year is available from the Huguenot Society of America to a decendant of a Huguenot ancestor.

(5) *Grants-in-Aid:* Recipients of these awards are able students who need financial assistance in order to meet the cost of attending college.

Number available: Approximately 400 annually.
Value: From $100.00 to $1,500.00 annually.

(6) *Remissions of Tuition:* Children of ministers in the North Carolina and Western North Carolina Conferences of the Methodist Church who are resident in the conference and children of ministers of all faiths residing in Durham County are eligible to receive a remission of the tuition charge for a maximum of eight semesters of undergraduate study at Duke University.

(7) *Tuition Grant:* Tuition grants are available to children of certain qualified staff members of Duke University for a maximum of eight semesters of undergraduate study at Duke University.

(8) *Corporate Scholarships:* Certain scholarships financed by private corporations are available annually to undergraduate students at Duke University. The selection of the recipients of these awards is made by the University Scholarship Committee. These scholarships are assigned to students whose records of scholarship and leadership are outstanding and whose financial need can be demonstrated.

Number available: 18.
Value: $500.00 to $2,000.00 annually.

CHRISTIAN VOCATIONS SCHOLARSHIPS: Students preparing to enter full-time religious work are eligible to apply for special consideration on the basis of need. These students will be required to submit the "Parents' Confidential Statement." Students with need will be recommended by the Executive Secretary of the University Scholarship Committee to the Christian Vocations Scholarship Committee which will consider the intention of the applicant. Students approved by the Christian Vocations Scholarship Committee are required to sign a note each semester for the amount of financial assistance granted to them by the University Scholarship Committee. These notes will be cancelled upon evidence that the student has entered full time Christian work after graduation. Pre-ministerial and religious education students ranking in the upper quarter of their graduating classes are encouraged to apply for an Angier B. Duke Memorial Scholarship.

AWARDS FOR FOREIGN STUDENTS: A limited number of awards will be made each year to qualified students from other countries who are accepted by the Office of Admissions as entering freshmen or as students with advanced standings. Candidates for these awards are required to submit the "Application for Scholarship" and the "Parents' Confidential Statement" of the College Scholarship Service provided by the Financial Aid Office of Duke University.

STUDENT LOANS: Students who have completed at least one semester in residence and who have satisfactory academic and citizenship records are eligible to apply for student loans. Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958, are available to qualified students.

Loans generally mature after borrowers have left the University. Loan interest on long term loans from University funds accrues at the rate of 1% from the date of each note. After a student has left the University permanently, the loans begin bearing interest at the rate of 3% per annum. The balance unpaid after five years bears interest at the rate of 6% per annum.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of loan funds under the National Defense Education Act of 1958 normally begins one year after the student terminates his education at the University, with complete repayment scheduled within a ten-year period. Interest accrues at the rate of 3% commencing one year after the borrower ceases to be a full-time student at an institution of higher education. Special benefits to those teaching in the public schools permit a portion of the loan to be cancelled depending upon the length of teaching

service. Complete details regarding the student loan program may be obtained by writing directly to the Student Loan Office.

The Student Loan Committee in approving loan applications selects those students who, from the standpoint of character, scholastic attainment, personality and degree of financial need, are deserving of this consideration. A student in residence may not, without special permission, own or operate a car during the academic year for which the loan is granted. Loan applications must be submitted not later than July 1, preceding the academic year for which assistance is requested.

STUDENT EMPLOYMENT: The Financial Aid Office maintains an employment office to serve students who need part-time jobs. There are many opportunities both on the campus and in the city of Durham. A considerable number of students each year help defray their college expenses by working.

Students may apply for part-time employment after they have received official notification of acceptance from the Office of Admissions. Such requests for employment should be made by letter prior to the date of entrance.

Those students in Trinity College and the College of Engineering in need of part-time employment should apply to the Financial Aid Office, Duke University, Durham, North Carolina. Students in the Woman's College should apply to the Assistant Dean of Undergraduate Women, 108 East Duke Building, Duke University, Durham, North Carolina.

# Medals and Prizes

THE achievements of undergraduate students are recognized in various fields of college activity. The following prizes suggest the range of the recognition:

The *Debate Council* authorizes the awarding of medals to members of the graduating class who have represented the University in at least two intercollegiate debates. The medals are given by the local chapter of the Tau Kappa Alpha Fraternity.

The *Robert E. Lee Prize* is the gift of the late Reverend A. W. Plyler, of the class of 1892, and Mrs. Plyler. The sum of $50 is awarded annually at Commencement, preferably to that member of the senior class of Trinity College or the College of Engineering who, in character and conduct, in scholarship and athletic achievement, in manly virtues and capacity for leadership, has most nearly realized the standards of the ideal student. The Vice-President in the Division of Student Life, the Graduate Director of Athletics, and the President of the Student Council constitute a committee to draft and adopt regulations governing the award.

*Alpha Kappa Psi Medallion.* Beta Eta Chapter of Alpha Kappa Psi, a professional fraternity in commerce, awards annually the Alpha Kappa Psi Scholarship Key to the male senior student pursuing a degree in the Department of Economics and Business Administration who has attained the highest scholastic average for three years of collegiate work in this University.

*Medal of the North Carolina Association of Certified Public Accountants.* The North Carolina Association of Certified Public Accountants annually awards a medal to the senior who, in the judgment of his instructors, is the most outstanding student in accounting in his graduating class.

*Julia Dale Prize in Mathematics* is a prize of books given annually to the undergraduate who shows the greatest proficiency in the study of calculus.

*The Milmow Prize* consists of a certificate of award and a one year's payment of dues in the American Institute of Electrical and Electronic Engineers for the membership year in which the honoree is awarded his baccalaureate degree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department and as shown by his grades, has made the most progress in electrical engineering during his last year in college.

*The George Sherrerd III Memorial Award in Electrical Engineering* was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. This award, consisting of the income from a fund of $5000.00, is made annually to that senior student in Electrical Engineering who, in the opinion of the Electrical Engineering faculty, has attained the highest level of scholastic achievement in all subjects and simultaneously has rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

*The Charles Ernest Seager Memorial Award,* established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the American Institute of Electrical and Electronic Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

*The American Society of Civil Engineers Prize* consists of a certificate of award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the Student Chapter, and his participation in other college activities and organizations.

*The Tau Beta Pi Prize.* The North Carolina Gamma chapter of Tau Beta Pi, engineering national honor society, awards each year a suitable prize, such as an engineering handbook, to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

*The Phi Lambda Upsilon Prize.* Phi Lambda Upsilon, honorary chemical society, yearly awards a suitable prize to an outstanding junior who is majoring in chemistry. The recipient's name is inscribed on a plaque displayed in the Chemistry Library.

*The Pegram Chemistry Club Prize* is awarded in the spring of each year for scholarship in chemistry, physics, and mathematics. The prize consists of a one-year junior membership in the American Chemical Society and a one-year subscription to either the *Journal of the American Chemical Society* or *Industrial and Engineering Chemistry.* To qualify for this prize, the student must (1) be enrolled as an undergraduate of Duke University and (2) be taking or have taken a fourth-year chemistry course. The winner of this prize is selected by a committee consisting of at least one faculty member and at least two members of the Pegram Chemistry Club; the selection is based on the quality-point average for all courses taken in chemistry, physics, and mathematics. In case of a tie equal awards are given.

*The James B. Rast Memorial Award* in Comparative Anatomy is given annually by the parents of James Brailsford Rast in memory of their son, a member of the class of 1958 at Duke University. The award, consisting of the *Atlas of Descriptive Human Anatomy* by Sobotta and bearing the James B. Rast Memorial bookplate, is given to the student who demonstrates the greatest achievement in the study of Comparative Anatomy.

*The Erasmus Club Prize in the Humanities.* The Erasmus Club is composed of a group of Duke faculty members interested in research in language, literature, and the arts. It seeks to stimulate interest and study in these fields. To encourage undergraduate students in this field, the Erasmus Club has established an annual prize amounting to $25.00, for the best original essay by an undergraduate which embodies the results of research, criticism, or evaluation in some subject in the humanities. Prospective competitors should consult a professor in their major field. Essays must be typewritten and must be submitted to the president of the club before the first of April. The Club reserves the right to withhold the prize in case there are no essays of acceptable quality.

*The Anne Flexner Memorial Award in Creative Writing* has been established by the family and friends of Anne Flexner, who graduated from Duke in 1945. It consists of fifty dollars in cash and a number of books chosen by the student. The award is given annually for the best piece of creative writing submitted by a Duke undergraduate. The competition is limited to short stories (5,000-word limit), one-act plays (5,000-word limit), poems (100-line limit), and informal essays (3,000-word limit). Only one manuscript may be submitted by a candidate, and it must be delivered to the English Office, Room 325 Allen Building, before April 15.

*The William Senhauser Prize* is given by the mother of William Senhauser in memory of her son, a member of the Class of 1942, who lost his life in the Pacific Theatre of War on August 4, 1944. The award is made annually to the sophomore or junior in Trinity College or the College of Engineering who has made the greatest contribution through participation and leadership in intramural sports. The winner of this prize is chosen by a committee selected by the President of the University.

The *Friends of Duke University Library* offer three prizes in an annual contest open to all undergraduate students for the best book collections acquired during their college year. The contest is supervised by the Undergraduate Committee of the Friends of the Library, which announces each fall the terms of the award. Inquiries may be directed to the Curator of Rare Books. Collections entered in the contest are exhibited each spring in the General Library. The prizes are awarded on the basis of the student's collection, a personal inter-

view to determine the overall planning and objectives of his collecting activity, and his familiarity with his own books and the general field of his collecting interest.

*The William T. Laprade Prize in History* in honor of William T. Laprade, who was a member of the History department at Trinity College and Duke University from 1909 to 1953, and chairman of the department from 1938 to 1952. This prize is awarded to that senior who is graduating with distinction and whose senior essay in history has been judged unusually meritorious.

*Algernon Sydney Sullivan Award.* This award is provided by the New York Southern Society. Three awards may be made each year: one to a member of the senior class of Trinity College or the College of Engineering, one to a senior in the Woman's College, and one to a member of the staff of the University or the community. "In the selection of the recipients nothing shall be considered except the possession of such characteristics of heart, mind, and conduct as evince a spirit of love for and helpfulness to other men and women."

# General Academic Regulations

## *Trinity College and Woman's College*

QUANTITY CREDIT AND COURSE LOAD: The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work. Two semesters of seventeen weeks each constitute the academic year. For the degree of Bachelor of Arts or Bachelor of Science, credit for 124 semester hours is required.

Selected superior students are given the opportuntiy to earn credit for independent study and research in programs approved and supervised by the faculty.

The normal load for an undergraduate student is four or five academic courses totaling 14 to 17 semester hours, exclusive of physical education. The maximum number permitted is 19 semester hours, exclusive of physical education. No student is permitted to take less than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than C.

COURSE AUDIT: With the consent of the instructor, the student is allowed to audit one or more courses in addition to the normal load. After the first week of classes in any semester, no student classified as an auditor in a particular course may take the course for credit, and no student taking a particular course for credit may change classification to an auditor. Under no circumstances may a student repeat for credit any course he has previously audited. Auditors submit no daily work, take no examinations, and receive no credit for courses.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are determined by grades as follows: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points. Credit for at least 248 quality points is required for the degree of Bachelor of Arts or Bachelor of Science.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION FROM COLLEGE: To continue in college students must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours, achieve a

specified quality point ratio (q.p.r.), and earn a minimum number of quality points. The quality point ratio is calculated by dividing the accumulated number of quality points earned by the accumulated number of semester hours carried (not semester hours passed). These requirements are listed in the following table:

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 18 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 42 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 66 s.h. credit and a q.p.r. of 1.70 |
| The fourth to the fifth year, if needed | 90 s.h. credit and a q.p.r. of 1.80 |

For graduation the minimum requirement is 124 s.h., 248 q.p. and a q.p.r. of 1.90. Students of the senior class, in order to be eligible for graduation, must complete the work of their senior year with a minimum average grade of C.

CLASS STANDING: To rank as sophomores, students must have to their credit at least 26 semester hours and 52 quality points; as juniors, at least 56 semester hours and 112 quality points; and as seniors, at least 90 semester hours and a quality point ratio of 1.80.

Seniors may not take for graduation credit any course open primarily to freshmen without the recommendation of the Director of Undergraduate Studies of their major department and the approval of the Dean. Juniors may not take for graduation credit more than one course open primarily to freshmen without a similar recommendation and approval.

Seniors who at the beginning of a semester lack no more than 9 semester hours for the fulfillment of the requirements for the A.B. or B.S. degree may enroll, with the approval of the Dean of the Graduate School, in graduate courses for a maximum total program of fifteen hours a week.

## *College of Engineering*

QUANTITY CREDIT AND COURSE LOAD: The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work. Two semesters of 17 weeks each constitute the academic year. For the degree of Bachelor of Science in Engineering, credit for a minimum of 142 semester hours is required.

The normal load is 16-19 semester hours, exclusive of physical education. No student is permitted to take less than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than C.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are earned by a student on the basis of his grades: for an A, four quality

points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION: To continue in college and to graduate, a student must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours and achieve a specified quality point ratio (q.p.r.). The quality point ratio is based solely on work performed at Duke and is calculated by dividing the total number of quality points earned by the total number of semester hours attempted at Duke. These requirements are listed in the following table:

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 18 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 48 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 78 s.h. credit and a q.p.r. of 1.70 |
| The fourth to the fifth year, if needed | 108 s.h. credit and a q.p.r. of 1.80 |

For graduation the minimum requirement is 142 s.h., a q.p.r. of 1.90, and a q.p.r. of 2.00 in senior work. A minimum average grade of C in all courses taken in the last year, combined with all courses designated for the senior year in the particular engineering curriculum.

ACADEMIC CLASS STANDING: *To be classified as a sophomore,* a student must have to his credit at least 22 semester hours and must have passed certain specially designated courses of the freshman engineering curriculum. *To be classified as a junior,* he must have to his credit at least 62 semester hours and must have passed certain specially designated courses of the sophomore departmental engineering curriculum. *To be classified as a senior,* he must have to his credit at least 102 semester hours and must have passed certain specially designated courses of the junior departmental curriculum.

## *Trinity College, Woman's College, and College of Engineering*

RESIDENCE REQUIREMENTS: The final four semesters—or equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, 30 of these 60 semester hours must be from those normally taken in the senior year. Students who meet this requirement but who still lack 6 to 8 semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the chairman of their major department and by the dean.

Students who complete in a summer session the work required by the University for the Bachelor's degree will be granted the degree at the end of the summer.

DISMISSAL: In addition to the qualitative standards listed above students must pass a minimum number of hours each semester. Freshmen must pass at least 6 semester hours of work in their first semester, 9 semester hours in the second semester (in engineering 3 required courses), and 18 semester hours in their first year; all other students must pass at least 9 semester hours each semester. Physical education credits are excluded in each case. The University may require a student whose record is considered unsatisfactory to withdraw, although he has met the minimum requirements set forth in this paragraph.

GRADING: Final grades are reported to indicate passing or failing work in designated courses. Final grades are:

(1) *Passing.* Passing grades are A, exceptional; B, superior; C, average; and D, low pass.

(2) *Failing.* A grade of F indicates that the student has failed the course and that in order to receive credit for the course he must repeat the work in class.

Special symbols are used to indicate the following:

(1) *Absence from the final examination.* In all cases in which the student is absent from a final examination, he receives an X instead of a final grade. If he does not present an acceptable explanation for his absence to the appropriate dean's office within forty-eight hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of $5.00 to the Treasurer of the University. The instructor concerned arranges for examination in cases where absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

(2) *Incomplete work.* If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be repeated in class if the student is to receive credit for it. In case a student whose work is incomplete is also absent from a final examination, he receives an X for the course.

(3) *Withdrawal.* The letter W is used to indicate official withdrawal from a course. If a student drops a course without permission from the Dean, the grade for that course is recorded as F. If he drops with permission a course in which he is failing, the grade for that course is recorded as F unless, in the judgment of the Dean, circumstances do not justify this penalty.

REPORTS: Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semes-

ter. In addition, six-weeks advisory grade reports on freshmen are mailed each semester.

ATTENDANCE REGULATIONS: The attendance regulations specifically place the responsibility for class attendance upon the individual student. A student is expected to attend his classes regularly and punctually. It should be recognized that one of the most vital aspects of a residential college experience is attendance in the classroom, and that the value of this academic experience cannot be fully measured by testing procedures alone. The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance; and, conversely, to recognize and accept the consequences of failure to attend. Instructors are privileged to refer to the dean for appropriate action any student who in their opinion is causing his work or that of the class to suffer because of absences or latenesses.

Because there will be a concentration of pressures on members of the student body to extend holiday periods, and because severely limited attendance would be detrimental to the conduct of the class as a whole, the following severe sanction is imposed for unexcused absences immediately before or after a holiday period: *Any unexcused absence of a student on his last class day before or his first class day after an official holiday period shall result in suspension from the University.* This suspension shall be immediate except when the absence is before or after the Christmas holidays, in which case the suspension will not take effect until the end of the fall semester. The student may apply for readmission for the semester following suspension. No instructor has the authority to waive these regulations.

The summer recess and the period between semesters is not a "holiday period" within the meaning of this regulation. In order to ensure the orderly beginning of classes and to make class spaces available to students who are in residence, the following regulations apply: Registration in a course shall be forfeited if a student does not attend the first meeting of the class and the space so vacated will be made available to another student. If a student whose absence has not been excused returns within the first week of school, he must reregister for his courses. A student who returns after the first week may not enroll that semester and will be required to apply for readmission.

Absences from required classes due to illness will be excused when certified by a proper medical official. Absences from required classes due to authorized representation of the University may be excused. Officials in change of groups representing the University are required to submit names of those persons to be excused to the appropriate

dean's office forty-eight hours in advance of the hour when their absences are to commence.

EXAMINATIONS: Final examinations are held in all subjects in January and May.

ADVANCED PLACEMENT: The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to sophomore-level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, while the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the deans of the colleges are charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board.

ADVANCED PLACEMENT COURSE CREDIT: Any student who has earned a score of 3 or higher on an Advanced Placement Examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of 4 or 5 the award of credit will be made automatically upon matriculation; for those presenting scores of 3 it will be determined with the approval of the University department concerned, no earlier than the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

TRANSFER CREDIT: Transfer credit, in which grades of C or above have been earned, is rated at two quality points per semester hour. Courses in which grades of less than C have been earned are not acceptable for transfer credit.

Credit for work completed at other institutions will be determined in relation to the curriculum requirements of the college in which the student enrolls at Duke.

Credit for courses in science or language offered for advanced standing in any of the undergraduate colleges by a transfer from a junior college will be determined by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is

given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses.

STUDY ABROAD: A student contemplating study abroad should be guided by the following provisions established by the Undergraduate Faculty Council and administered by the Committee on Study Abroad.

The student should

(a) have a scholastic average of at least 2.5 (recommended);
(b) obtain prior permission to study abroad from major adviser and academic dean;
(c) receive certification from the foreign language department concerned that he can handle adequately the language of the country where he will study, provided that the language be taught at the freshman-sophomore level at Duke;
(d) obtain in advance, wherever possible, approval of his program of studies from major adviser and academic dean.

If the student wishes to transfer credit to Duke and

(a) is participating in a program sponsored by an American group, the group must have been approved by the above committee and the program he proposes must meet the qualifications of the sponsoring group

or (b) studies abroad under his own sponsorship, work to be considered for transfer must be done in the language in which courses are normally given in the institutions attended.

INDEPENDENT STUDY: Students who have a 3.0 quality point ratio overall and in their major may be permitted to enroll for independent study during their junior and senior years. The courses, numbered 191, 192 and 193, 194, are designed to permit students to pursue individual research and reading in a field of special interest. The student will pursue an extensive program of independent reading, subject to the supervision of a member of the staff. A student need not be in a Graduation with Distinction program to enroll in independent study courses. The maximum credit allowed for independent study and honors research courses is 3 semester hours per semester during the junior year and 6 semester hours per semester during the senior year. Interested students should consult the Director of Undergraduate Studies in the department in which they wish to work.

## *Academic Honors*

DEAN'S LIST: In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's

work of not less than the minimum academic load are placed on the Dean's List.

CLASS SCHOLARS: The five students in each combined undergraduate class of the University (including Trinity College, The Woman's College, and the College of Engineering) who achieve the highest quality point ratio on at least a normal course load for each academic year shall be designated Class Scholars.

CLASS HONORS: To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which he is registered. All semester hours on which a student receives a grade are counted in the determination of Class Honors. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio are eligible for Class Honors.

GRADUATION HONORS: To be eligible for consideration for Graduation Honors at graduation a student must have completed in residence a minimum of ninety semester hours. Students who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude.* Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude.*

GRADUATION WITH DISTINCTION: At the beginning of their junior or senior year, students of superior ability may be selected by their major department to enter a special program. Those among the selected candidates that demonstrate, to their department and a committee of the faculty, exceptional achievement in the area of their special interest will be Graduated with Distinction. (Students who participate in the program must complete a minimum of 18 semester hours above the introductory courses in their major in addition to the credit received from courses directly related to the Graduation with Distinction program.)

HONORS-MASTERS PROGRAM: This program, which is made possible partly by a grant from the Ford Foundation's Fund for the Advancement of Education, aims at the recruitment and accelerated preparation of college and university teachers. Academically superior undergraduates are selected by the Honors-Masters Committee during the spring of their sophomore year. During the junior year, these pregraduates are enrolled in Colloquium 101, 102; normally the pregraduates will be candidates for graduation with distinction in their major departments. Emphasis is also placed on the acquisition of reading knowledge of two satisfactory foreign languages prior to the beginning of graduate work. Summer school scholarships as well as a limited number of first-year graduate scholarships are available.

# Other Regulations

CONDUCT AND DISCIPLINE: The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of scholarship. General University regulations concerning conduct of students will be made available to students when admission is offered, or upon request. The student in accepting admission indicates his willingness to subscribe to those regulations. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of the Vice-President in the Division of Student Life. Immediate supervision is entrusted to the Dean of Men and the Dean of Women. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morality and honor, the student body has become to a great degree self-governing. Two councils, one of men and the other of women, each composed of duly elected representatives of the student body, exercise the authority granted the students by their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to make recommendations of penalties based on their findings. They exert a guiding and stimulating influence for the promotion of high ideals of conduct and of student relationships.

MOTOR VEHICLES: Freshmen are not permitted to own or operate motor vehicles at the University. In accordance with University regulations members of the upper classes of Trinity College and the College of Engineering and seniors in the Woman's College may operate motor vehicles.

Students permitted to operate motor vehicles must register them annually at the beginning of the fall semester, or if the vehicle is acquired later, within five days after bringing it to the campus. Students must show a state vehicle registration and a state operator's license. A standard certificate of automobile liability insurance, issued by a recognized company and evidencing coverage of at least $5,000 per person and $10,000 per accident for personal injury and $5,000 for property damage is also required. There is a registration fee of $30.00 per vehicle for each academic year.

Students under 21 years of age must have the written consent of parent or guardian before operating a motor vehicle at Duke.

SCHOLASTIC REGULATIONS FOR PARTICIPATION IN ATHLETICS AND OTHER ACTIVITIES: Members of athletic teams or other student groups engaging in public representation of the University are expected to be carrying their current work satisfactorily. Students may be barred from participation in such representation if, in the opinion of the dean of their college, they fail to meet this requirement.

ENROLLMENT AND REGISTRATION: Students in residence are required to submit, not later than the date of the spring registration, cards showing their selection of courses for the following year. Evidence of the payment of the continuing pre-registration deposit of $25.00 (see page 20 for detailed information) is required before the card may be submitted. These cards are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the appointed time must be readmitted to the college by application to the Director of Admissions. Each student planning to continue enrollment for the following year must apply for a room or obtain permission to live off campus prior to the end of the spring semester. Students whose course cards have been approved in the spring may enroll by mail during the summer. The same regulations, with the exception of the advanced deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that prescribed in the Calendar of the Colleges must pay to the Treasurer a fee of $5.00. (See attendance regulations, page 34.) Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

READMISSION OF FORMER STUDENTS: A student who desires to return, following withdrawal from college, should apply to the Director of Admissions, and send a detailed statement of his activities since withdrawal.

TRANSCRIPTS: Requests for transcripts should be directed to the Office of the Registrar. Ten days should be allowed for processing. One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

# Requirements for Degrees

DUKE UNIVERSITY offers in Trinity College, the Woman's College, and the College of Engineering, courses of study which lead to the degrees of: Bachelor of Arts; Bachelor of Science; and Bachelor of Science in Civil, Electrical, or Mechanical Engineering.

## *Bachelor of Arts*

The requirements for the degree of Bachelor of Arts are based on the principle that the student will derive the maximum benefit from his college work if his program includes a broad distribution of studies among representative fields of culture, concentration within a special field, and some work of his own choice.

For graduation with the degree of Bachelor of Arts, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

| Uniform Course Requirements | s.h. |
|---|---|
| English | 6 |
| Foreign Language | 6–18 |
| Natural Science | 8 |
| Formal Science | 3 |
| Religion | 6 |
| Social Science and History | 12 |
| Humanities | 12 |
| Physical Education | 4 |
| Major and Related Work | 42 |
| Electives to Make a Total of | 124 |

These requirements are described in detail below.

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

FOREIGN LANGUAGE.—The languages which meet this requirement are French, German, Greek, Latin, Russian, and Spanish. This requirement is fulfilled by one of the following: 1.) a passing grade in French 64, German 92 or equivalent, Greek 106 or 108, Latin 92, Russian 64 or Spanish 64; 2.) a satisfactory score on the placement test, plus a validating year (two literature courses numbered 90 or above); 3.) passing a proficiency examination. (The proficiency examination can be taken only by students who have been enrolled in language work in the University and is not available to entering Freshmen.) Students presenting for entrance four units of Latin may satisfy the language requirements by the completion of the third college year of Latin or two years of Greek.

Students enrolled during the fall of 1962 in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 bulletin.

NATURAL SCIENCE, 8 s.h.—To satisfy this requirement a student must complete a laboratory course in one of the natural sciences (botany, chemistry, geology, physics, or zoology).

FORMAL SCIENCE, 3 s.h.—One course of at least 3 semester hours selected from mathematics (except mathematics 11), logic and scientific methodology (Philosophy 48, 103 and 104).

RELIGION, 6 s.h.—This requirement may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

SOCIAL SCIENCE AND HISTORY, 12 s.h.—To satisfy this requirement a student must complete 12 semester hours in two departments from the following basic courses: Economics 51-52; Education 54-104; History 1-2, or 51-52; Political Science 11-12, or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

HUMANITIES, 12 s.h.—To satisfy this requirement a student must complete 12 semester hours from the following courses, with six hours in each of two divisions: (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

I. Literature: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation.

II. Philosophy 41-42, 93-94.

III. Art and Music: Art 1-2, 51-52; Music 1-2, 51-52.

PHYSICAL EDUCATION, 4 s.h.—Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

MAJOR IN RELATED WORK, 42 s.h.—Prior to registration in the spring of his sophomore year, each student is required to choose his major field and confer with his departmental adviser about the requirements for major and related work. The major work consists of 18 to 24 semester hours in one department above the introductory courses. Introductory courses consist of two one-semester courses in all departments except the departments of Economics and Business Administration, German, Latin, Music, and Romance Languages, in which the introductory courses may consist of four one-semester courses. The choice of courses must be approved by the major department. Whenever the department defines the major as 24 hours above the introductory courses, the student, with the prior approval of the Director of Undergraduate Studies, may substitute 6 hours of advanced work normally taken by a major in a related discipline during his junior or senior year. Eighteen hours of related work must be taken in at least two other departments and is selected subject to the approval of the major department and the dean of the appropriate college; it may not include more than one course of 6 or 8 semester hours open primarily to freshmen. With the consent of the department, however, majors in mathematics, the natural sciences, and science education may include as related work introductory courses in mathematics and the natural sciences. Although courses satisfying the uniform course requirements may also be counted toward the requirements in major and related work, no student may satisfy two uniform course requirements with the same course.

ELECTIVES.—In addition to the uniform courses required and the major and related work, other courses must be completed to make a total of at least 124 semester hours, including 4 semester hours of physical education.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the dean of the appropriate college.

## CHOICE OF A MAJOR FIELD

The requirement of 42 semester hours distributed, as specified above, between a major field and related work is based primarily on the belief that some advanced study in one subject, together with work in allied subjects is a valuable part of a general education. The

selection of a major field usually depends on a student's cultural or vocational interests.

## GENERAL PROGRAM

The General Program is designed for the student whose primary interest is in one of the liberal arts subjects. The subjects in which major work is offered are: art, botany, chemistry, economics, education, English, French, geology, German, Greek, history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, Russian, sociology, Spanish, zoology.

## SPECIALIZED PROGRAMS

A student who has chosen a particular field may wish to take more course work in a major or related discipline than is required by his major department. The following programs of study offer a guide in planning this work, especially as it applies to preparation for various professions or professional schools.

### Undergraduate Programs

Accounting: A student may specialize in public or industrial accounting in his Junior and Senior years. In either case the same courses should be taken in the Freshman and Sophomore years.

Freshman Year: Mathematics 17 or 21.
Sophomore Year: Economics 51-52,
Economics 57, 58, and Economics 138.

### *Public Accounting*

The following sequence of courses includes more than the requirement for a major in accounting. It lists, however, the courses needed to meet the current requirements of the North Carolina Board of Certified Public Accountants.

| *Junior Year* | *Senior Year* |
|---|---|
| Ec. 143—Corporation Finance | Ec. 273—Auditing Theory and Practice |
| Ec. 149—The Theory of the Firm | Ec. 274—Advanced Auditing |
| Ec. 153—Money and Banking | Ec. 275, 276—Advanced Industrial |
| or Ec. 154—Aggregative Economics | Accounting and Management |
| Ec. 171—Accounting Theory | Ec. 277—Income Tax Accounting |
| Ec. 172—Corporate Accounts | Ec. 295—Advanced Acctg. Seminar-Theo. |
| Ec. 181—Business Law | Ec. 296—Advanced Acctg. Seminar-Pract. |

Election of one of the following:

Ec. 144—Investments
Ec. 178—Accounting Systems
Ec. 182—Business Law
Ec. 189—Business and Government
Ec. 249—Product Markets

### *Industrial Accounting*

| *Junior Year* | *Senior Year* |
|---|---|
| Ec. 143—Corporation Finance | Ec. 153—Money and Banking |
| Ec. 149—The Theory of the Firm | or Ec. 154—Aggregative Economics |

Ec. 171—Accounting Theory
Ec. 172—Corporate Accounts
Ec. 189—Business and Government
Ec. 273—Auditing Theory and Practice
Ec. 275, 276—Advanced Industrial Accounting and Management
Ec. 277—Income Tax Accounting
Ec. 279—Budgeting and Control
Ec. 190—The Use of Quantitative Methods in Business
Ec. 291—Business Policy

BUSINESS: A specialized program is offered for students planning to enter business. A student electing this program must take, in addition to the uniform course requirements, the following courses in the sequence indicated.

| | |
|---|---|
| Freshman Year: | Mathematics 17 or 21 |
| Sophomore Year: | Economics 51-52, Economics 57, 58, and Economics 138. |
| Junior Year: | Economics 143 and Economics 149. |
| | Economics 153 and Economics 154. |
| Senior Year: | Economics 249, Economics 185 or 190, and Economics 291. |

MUSIC EDUCATION: The following course sequence is designed for prospective teachers of high school instrumental or vocal music. Although it includes more than the number of hours required for a major in music, it represents those courses recommended by the Music Department for state certification: Music 51-52, 65-66, 115-116, 121-122, 147-148, 3 additional semester hours in Music Literature, and 18 semester hours in Applied Music.

Other areas of concentration in music are described on pages 99-104 of this *Bulletin*.

TEACHING: Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers.

The program for students who intend to teach is designed to prepare for positions either in elementary or secondary schools. All prospective teachers must take Psychology 91, preferably during the sophomore year, and Education 100 preferably during the junior year. Only students with an average of 2.0 overall and in their major or teaching fields will be admitted to student teaching. Special methods courses should be taken prior to undergraduate student teaching, which may be done *only* in the senior year.

Whatever their majors, students should consult an appropriate member of the Department of Education prior to each registration period to assure their meeting the certification requirements of the states in which they wish to teach and having places reserved for them in student teaching.

*Elementary-School Teaching.* Students preparing to teach in the elementary school must complete the following specific requirements in addition to Psychology 91 and Education 100: Education 101, 102, 105, 106, 107, 108, 118, and 161; Economics 115 or 120; History 91, 92; Music 151, 152; Health Education 134, and Physical Education 102.

*Secondary-School Teaching.* Students preparing to teach in a secondary school may meet certification requirements by qualifying in one teaching subject, but they are strongly advised to choose courses that meet requirements in two teaching subjects. Prospective secondary-school teachers must major in a subject other than education.

*Science Education Major.* Students who intend to teach sciences in the high school may major in Science Education. The program is designed to meet certification requirements and to provide the broad background of preparation in the sciences which is needed by science teachers. Students planning to enter this program should consult an adviser in the Department of Education and in one of the science departments. The basic requirements are: Education 100, 118, 215, 216, and 276 or 246; Mathematics 21 and 22; Sciences (botany, chemistry, geology, physics, and zoology) and mathematics above 22; 36-40 s.h. (Courses must be taken in at least two science departments, 12 s.h. above the introductory level.)

### Preparation for Graduate and Professional Schools

Many graduate and professional schools require special tests for students seeking admissions. Information regarding the test requirements should be obtained from the catalogue of the schools to which the student plans to apply. The Bureau of Testing and Guidance has available applications for required graduate and professional testing programs.

Graduate School: The student who plans to enter a graduate school of arts and sciences for advanced study should consult an adviser in the field of the proposed advanced study concerning suitable preparation. Most graduate schools have definite requirements in foreign languages for all students. Candidates for the degree of Doctor of Philosophy are required to pass reading examinations, usually in German and French. In some cases other languages may be substituted. As soon as practicable, the student should ascertain the requirements of the particular graduate school he desires to enter.

Law School: Students who plan to prepare for Law School may select their major work in any field. The following courses are recommended:

Economics 51-52, 57, 58.
English 55-56.
History 1-2 or 51-52, 105-106.
Philosophy 48 and 41.
Political Science 61-62.
Sociology 91-92.

Medical and Dental Schools: Students planning to enter a medical or dental school should arrange their programs of study from the first semester so as to include those courses required by the profession-

al schools of their choice. These courses usually include two years of English, two years of chemistry, and one year each of biology, mathematics, and physics. At Duke University the courses normally taken are English 1-2 and 55-56, Chemistry 1, 2, 61, 151, and 152, Zoology 1 and 2, Mathematics 21-22, and Physics 41-42. Most professional schools require ninety semester hours of college credit before consideration for admission. Because individual medical and dental schools strongly recommend, or, in some cases, require specific courses in addition to those listed above, it is wise for the student to be fully aware of any additional requirements established by the professional school of his choice.

The minimum uniform course requirements and those of the major and its related work for either the A.B. or B.S. degree must be fulfilled for graduation. The latter requirements are described for each department under Courses of Instruction in this *Bulletin*. Each student may elect to major in the department of his choice, but should understand that even with careful program planning starting his first semester, it may be necessary to exceed the 124 semester hours required for graduation.

The pre-professional student usually registers for the following program during his first year:

English 1-2.
Mathematics 21-22.
*Two laboratory sciences.
†Uniform requirement.
Physical Education 1-2.

THEOLOGICAL SCHOOLS AND RELIGIOUS WORK: A student who plans to enter the ministry or follow some other professional Christian vocation should have a broad liberal arts background. Recommended majors are English, history, philosophy, religion, and sociology. It is desirable that the student include the following in his program:

English: 12-18 s.h. (including English 55, 56).
History: 6-12 s.h.
Philosophy: 6-12 s.h. (including Philosophy 93, 94).
Psychology: 12-18 s.h.
Social Sciences (other than history): 6-12 s.h.

These suggestions are in harmony with the recommendations of the American Association of Theological Schools for undergraduate courses of study.

* The student planning to enter medical or dental school who elects only one laboratory science should begin the foreign language sequence the first year.

† Programs of the first two years should normally be completed with courses which fulfill minimum uniform requirements. Electives are limited and should be postponed until late in the program.

# *Bachelor of Science*

For graduation with the degree of Bachelor of Science, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

| UNIFORM COURSE REQUIREMENTS | S.H. |
|---|---|
| English | 6 |
| Foreign Language | 8–24 |
| Mathematics | 6 |
| Natural Science | 8 |
| Social Science and History | 6 |
| Religion | 6 |
| Humanities | 6 |
| Physical Education | 4 |
| MAJOR AND RELATED WORK | 48 |
| ELECTIVES TO MAKE A TOTAL OF | 124 |

These requirements are described below.

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

FOREIGN LANGUAGE.—Bachelor of Science candidates must complete the second college year, or equivalent as determined by examination, of one foreign language, and the first college year of another. The languages submitted will be determined by the major department. Students enrolled, during the fall of 1962, in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 *Bulletin*.

MATHEMATICS, 6 s.h.—This requirement may be met by completion of Mathematics 21 and 22.

NATURAL SCIENCE, 8 s.h.—This requirement can be satisfied by courses in one of the natural sciences, namely, botany, chemistry, geology, physics, and zoology. The courses must include laboratory work.

SOCIAL SCIENCES AND HISTORY, 6 s.h.—This requirement can be satisfied by either of the following 6-hour sequences; Economics 51-52; Education 54-104; History 1-2, or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

RELIGION, 6 s.h.—This requirement may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

HUMANITIES, 6 s.h.—This requirement can be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music, 1-2, 51-52. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

PHYSICAL EDUCATION, 4 s.h.—Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

MAJOR AND RELATED WORK, 48 s.h.—Major and related work consists of at least 48 semester hours in the natural sciences. This work must be selected from the departments of botany, chemistry, geology, mathematics, physics, psychology, and zoology. The major work consists of a minimum of 18 semester hours in one department above the introductory courses. The choice of courses is subject to the approval of the department. Whenever the department defines the major as 24 hours or more above the introductory courses, the student, with the prior approval of the director of undergraduate studies, may substitute 6 hours of ad-

vanced work normally taken by a major in a related discipline during his junior or senior year. The related work is taken in at least two other departments and is selected subject to the approval of the major department. With the consent of the department, majors in mathematics and the natural sciences may include as related work introductory courses in mathematics, the natural sciences, and science education. A minimum of 14 semester hours of related work is required, 8 hours of which must be in laboratory science. Although courses fulfilling the uniform course requirements may also be counted toward the requirements in major and related work, no student may satisfy two uniform course requirements with the same course.

ELECTIVES.—In addition to the above, the student must elect sufficient courses to complete the 124 semester hours necessary for graduation.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the dean of the college.

On or before the date announced for the spring registration, every sophomore in this group should select his major department in the natural sciences and arrange, under the guidance of an adviser in the major department, his program of studies for the following year. He should obtain the adviser's written approval of all courses selected in the division before submitting his program to the dean for final action. In like manner, each upperclassman will recheck the courses in his division of concentration each year with a representative of his major department.

## *Bachelor of Science in Civil, Electrical, or Mechanical Engineering*

The College of Engineering offers fully accredited four-year programs in civil, electrical, and mechanical engineering leading to the degrees of B.S. in C.E., B.S. in E.E., or B.S. in M.E.

In addition to the standard four-year program, to make it possible for some students to combine with their professional engineering training an enlarged program of humanities and social studies, the College of Engineering has developed a special plan of cooperation with selected liberal arts colleges. Under this "three-two" plan an outstanding student may follow an approved program of study at the cooperating liberal arts college for an initial period of three years and then come to Duke University to complete his studies at the College of Engineering in two more years. Upon completion of the combined program of five years, a degree is granted by the cooperating liberal arts college, and a degree of Bachelor of Science in the appropriate branch of engineering by the College of Engineering. Inquiries concerning this plan should be addressed to the Dean, College of Engineering, Duke University, Durham, North Carolina, 27706.

# GROUPS OF STUDIES FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL, ELECTRICAL, OR MECHANICAL ENGINEERING

## §*Uniform Freshman Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Engrg | 1 | Engineering Graphics | 2 | Engrg | 2 | Descriptive Geometry | 2 |
| Engl | 1 | English Composition | 3 | Engl | 2 | English Composition | 3 |
| Hist | 1 | Modern History | 3 | Hist | 2 | Modern History | 3 |
| Math | 21 | Introductory Calculus | 3 | †Math | 22 | Introductory Calculus | 3 |
| Phys | 41 | General Physics | 4 | Phys | 42 | General Physics | 4 |
| PE | | Physical Education | 1 | PE | | Physical Education | 1 |
| | | | *16 | | | | *16 |

## CIVIL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Chem | 1 | Gen. Inorg. Chemistry | 4 | Chem | 2 | Gen. Inorg. Chemistry | 4 |
| †CE | 61 | Surveying | 5 | CE | 72 | Materials Laboratory I | 1 |
| Engrg | 57 | Statics | 3 | †Engrg | 107 | Mechanics of Materials | 3 |
| Math | 63 | Intermediate Calculus | 3 | Engrg | 109 | Materials Laboratory | 1 |
| ‡Approved Elective | | | 3 | Engl | 93 | Technical Communication | 3 |
| PE | | Physical Education | 1 | Math | 64 | Intermediate Calculus | 3 |
| | | | 19 | ‡Approved Elective | | | 3 |
| | | | | PE | | Physical Education | 1 |
| | | | | | | | 19 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 101 | Materials Lab. II | 1 | CE | 113 | Route Surveying | 2 |
| CE | 118 | Engrg. Materials | 2 | CE | 133 | Reinforced Concrete | 3 |
| †CE | 131 | Structural Mech. I | 3 | EE | 123 | EE Fundamentals | 3 |
| CE | 135 | Soil Mechanics | 2 | EE | 125 | EE Fundamentals Lab. | 1 |
| Engrg | 115 | Dynamics | 3 | †Engrg | 128 | Fluid Mechanics | 3 |
| ME | 103 | Thermodynamics | 3 | ‡Approved Electives | | | 6 |
| ME | 116 | ME Laboratory | 1 | | | | 18 |
| ‡Approved Elective | | | 3 | | | | |
| | | | 18 | | | | |

### *Senior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 123 | Hydraulic Engrg. | 3 | CE | 116 | Transporation Engrg. | 3 |
| CE | 124 | Sanitary Engrg. | 3 | CE | 140 | Structural Mechanics II | 3 |
| CE | 132 | Structural Design | 4 | CE | | Elective | 3 |
| CE | 146 | Professional Engrg. | 2 | ‡Approved Electives | | | 9 |
| ‡Approved Electives | | | 6 | | | | 18 |
| | | | 18 | | | | |

§There is a single, common program in the Freshman Year; final choice of a department is not made until the time of registration for the sophomore year.

†Courses which must be passed before engineering academic standing can be advanced.

*Freshman engineering students taking Air Science or Naval Science will schedule certain courses in addition to the 16 semester hours prescribed for each semester.

‡Part of a program of 30 semester hours of electives planned with departmental approval to suit the interests and abilities of each student. The program will include three semester hours of mathematics beyond calculus; an additional nine semester hours in mathematics, the sciences, or other technical subjects; and another 15 semester hours in the humanities or the social sciences, including six semester hours of either economics or political science.

A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

## ELECTRICAL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 1 | Gen. Inorg. Chemistry | 4 |
| Econ | 51 | Principles of Economics | 3 |
| EE | 53 | E. E. Fundamentals | 1 |
| EE | 55 | Electric Networks I | 4 |
| Engl | 93 | Technical Communication | 3 |
| Math | 63 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 2 | Gen. Inorg. Chemistry | 4 |
| Econ | 52 | Principles of Economics | 3 |
| †EE | 56 | Electric Networks II | 4 |
| Engrg | 60 | Engineering Mechanics | 4 |
| Math | 64 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 109 | Electromagnetic Systems | 4 |
| EE | 111 | Electrical Prin. Lab. | 2 |
| Engrg | 107 | Mechanics of Materials | 3 |
| Math | 111 | Applied Math Analysis I | 3 |
| Phys | 161 | Modern Physics | 3 |
| ‡Approved Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| †EE | 110 | Electromagnetic Systems | 4 |
| EE | 112 | Electrical Prin. Lab. | 1 |
| Engrg | 128 | Fluid Mechanics | 3 |
| Math | 112 | Applied Math Analysis II | 3 |
| ME | 103 | Thermodynamics | 3 |
| ME | 116 | M. E. Laboratory | 1 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

### *Senior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 165 | Seminar | 1 |
| EE | 181 | Electronic Networks | 3 |
| EE | 183 | Electronics Laboratory | 1 |
| EE | 191 | Electric Machinery | 3 |
| EE | 193 | Energy Conversion Lab. | 1 |
| ‡EE Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H |
|---|---|---|---|
| EE | 166 | Seminar | 1 |
| EE | 182 | Electronic Networks | 3 |
| EE | 184 | Electronics Laboratory | 1 |
| EE | 192 | Electric Machinery | 3 |
| EE | 194 | Energy Conversion Lab. | 1 |
| ‡Approved Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

†Courses which must be passed before engineering academic standing can be advanced.

‡Part of a planned program of electives to be chosen in consultation with the adviser. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the mimimum program.

## MECHANICAL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Chem | 1 | General Inorg. Chem. | 4 | Chem | 2 | General Inorg. Chem | 4 |
| Engrg | 60 | Engineering Mechanics | 4 | Engrg | 107 | Mechanics of Materials | 3 |
| Math | 63 | Intermediate Calculus | 3 | Engrg | 109 | Materials Laboratory | 1 |
| ME | 52 | Kinematics Kinetics | 3 | †Math | 64 | Intermediate Calculus | 3 |
| ‡Humanities-Social Studies Elective | | | 3 | ME | 105 | Dynamics of Fluids | 3 |
| PE | | Physical Education | 1 | ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 | PE | | Physical Education | 1 |
| | | | | | | | 18 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| EE | 123 | Fundamentals of E. E | 3 | EE | 124 | Industrial E. E | 3 |
| EE | 125 | Elec. Fundamentals Lab. | 1 | EE | 126 | Industrial Elec. Lab. | 1 |
| Math | 111 | Applied Math. Analysis I | 3 | Engl | 93 | Technical Communication | 3 |
| ME | 101 | Thermodynamics | 3 | Math | 112 | Applied Math. Analysis II | 3 |
| †ME | 106 | Heat Transfer | 3 | †ME | 102 | Thermodynamics | 3 |
| ME | 141 | Machine Design | 3 | ME | 114 | M. E. Laboratory | 2 |
| ‡Humanities-Social Studies Elective | | | 3 | †ME | 142 | Machine Design | 3 |
| | | | 19 | | | | 18 |

### *Senior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Econ | 51 | Principles of Economics | 3 | | | | |
| ME | 59 | Materials and Processes | 3 | ME | 156 | Combustion Engines | 3 |
| ME | 159 | M. E. Laboratory | 1 | ME | 160 | M.E. Laboratory | 1 |
| ME | 171 | Response of Phys. Systems | 3 | ME | 162 | Power Plants | 3 |
| ME | 173 | Seminar | 1 | ME | 174 | Seminar | 1 |
| ME | | Elective | 3 | ‡Approved Electives | | | 6 |
| ‡Approved Electives | | | 6 | ‡Humanities-Social Studies Elective | | | 3 |
| | | | 20 | | | | 17 |

†Courses which must be passed before engineering academic standing can be advanced.

‡The electives form a planned program to be chosen in consultation with the adviser. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

## *Academic-Professional Courses*

The provision whereby a senior may elect the work of the first year in a professional school of the University shall apply solely to eligible students in Trinity College or the Woman's College. The privilege of completing a combined course for the degree is conditioned upon admission to the professional school at the close of the junior year. A student thus admitted registers as a senior in college and as first-year student in the professional school.

## ACADEMIC-FORESTRY COMBINATION

Pre-professional training in forestry is offered to students of Trinity College who are planning careers in professional forestry. A student who has completed the 3-year program of students in the liberal arts and sciences outlined below, and who has earned an average grade of C or higher (exclusive of physical education) may, with the approval of the Deans of Trinity College and the School of Forestry, respectively, transfer to the School of Forestry. Upon the satisfactory completion of the forestry course requirements in the Summer Session, and those required in the first year in the School of Forestry (see *Bulletin of the School of Forestry*) the student will be eligible for the degree Bachelor of Science from Trinity College, Duke University.

The professional degree of Master of Forestry may be earned upon satisfactory completion of the work of the second year in the School of Forestry.

Students wishing information concerning admission to the School of Forestry are invited to consult with the Chairman of the Committee on Admissions of that school.

The program of studies in preparation for admission to the School of Forestry under this combination program includes the following:

| | S.H. |
|---|---|
| Uniform Course Requirements for the B.S. Degree | 48–66 |
| Additional Required Courses | 24–26 |
| Electives to Make a Total of | 94 |
| Summer Field Work | 12 |

*Uniform Course Requirements:* These requirements are described in the Requirements for the Bachelor of Science degree in this *Bulletin*. French, German, Russian, or Spanish may be used to fulfill the foreign language requirement. The natural science requirement is met by completion of Botany 1-2. The social science and history requirement is met by completion of Economics 51-52.

Additional Required Courses:

| | S.H. |
|---|---|
| Chemistry 1-2 | 8 |
| Engineering Drawing 1-2 | 4 |
| Geology 51 | 4 |
| Physics 1-2 | 8 |
| | 24 |

*Electives:* The electives are normally chosen from botany, chemistry, economics, mathematics, and philosophy. A minimum of 94 semester hours must be obtained, exclusive of summer field work, to meet uniform course requirements, additional required courses, and electives.

*Summer Field Work:* This work of 12 weeks, to be taken upon completion of the junior year, includes:

| | S.H. |
|---|---|
| Plane Surveying (C.E. 110) | 3 |
| Forest Surveying and Aerial Photo Interpretation (F. 150) | 3 |
| Forest Mensuration (F. 151) | 3 |
| Silvics (F. 243) | 3 |
| | 12 |

Trinity College students in this combination are encouraged to consult with the special adviser for students in Academic Forestry Combination. The name of this adviser may be obtained at the School of Forestry office.

## ACADEMIC-LAW COMBINATION

A student who has completed, with an average grade of C or higher, 96 semester hours of undergraduate work, including the uniform course requirements for the degree of Bachelor of Arts and the work of the junior year in his major and related fields, may, with the approval of the dean of the college, transfer to the Duke University School of Law and be eligible for the degree of Bachelor of Arts from Duke University upon the satisfactory completion therein of the work of the first year.

It is understood that this provision shall apply solely to eligible undergraduates who have completed three years in residence in Duke University, and that not less than the full first-year's work of the Law School will be acceptable for credit towards the bachelor degree.

No single discipline or program of study can be described as the best preparation for the study of law since there are various methods of approach to legal study.

Completion of the undergraduate work necessary to qualify for the Academic-Law Combination does not insure admission to the Duke University School of Law, nor impose any restriction whatever upon its freedom in selecting students for admission. Students wishing further information are invited to consult with the Dean of the School of Law.

# Courses of Instruction

# Trinity College and the Woman's College

NOTE: Courses primarily for freshmen are numbered from 1 to 49; those primarily for sophomores are numbered from 50 to 99; those primarily for juniors and seniors from 100 to 199; those primarily for seniors and graduates from 200 to 299. The amount of credit for each course is given in semester hours following the description of the course.

The designation of (W) or (E) indicates that the course is to be given on the West Campus or on the East Campus. Odd-numbered courses are usually offered in the fall semester; even-numbered courses in the spring semester. *For courses which will be offered in 1963-64, consult the Official Schedule of Courses available to enrolled students in the Registrar's Office.*

Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course credit may be received for either semester without special permission.

## AIR SCIENCE

PROFESSOR SCHLÖGL, LT. COLONEL, USAF, CHAIRMAN; ASSOCIATE PROFESSOR OLDHAM, MAJOR, USAF, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR WILSON, CAPTAIN, USAF

ELIGIBILITY REQUIREMENTS.—All physically qualified Freshmen who are citizens of the United States and are enrolled in Trinity College or the College of Engineering are eligible to enroll in the Air Force ROTC. Veterans and Senior Division ROTC Students may be exempted from Freshman or Sophomore courses under certain conditions. In special cases where permission has been granted, certain qualified students from the Graduate and Professional Schools may be enrolled.

DEPOSIT REQUIRED.—Each student must make a deposit of twenty dollars with the University Treasurer to insure return of all Government Property.

COURSE OF STUDY.—The course of study of AFROTC students is composed of courses in the Air Science Department and designated courses in other departments which in the opinion of the Air Force are essential to the education of an Air Force Officer. In addition to classroom instruction the Air Force requires Leadership Laboratory each semester.

### BASIC COURSES

*First Year Basic*

AS 1. LEADERSHIP LABORATORY and one course selected from the academic fields of Freshman Mathematics, Foreign Language, or Physical Sciences. STAFF

AS 2. FUNDAMENTALS OF AEROSPACE WEAPON SYSTEMS.—An introductory survey of aerospace craft and missiles, their propulsion and guidance systems:

target intelligence and electronic warfare; nuclear, chemical and biological warhead agents; defensive, strategic and tactical operations; problems, mechanics and military implications of space operations; and a survey of contemporary military thought. Leadership Laboratory is required. 2 s.h. (W) WILSON

*Second Year Basic*

AS 51. WORLD MILITARY SYSTEMS.—A comparative study of free world military forces, Communist military systems, and trends in the development and employment of military power. 2 s.h. (W) WILSON

AS 52. LEADERSHIP LABORATORY and one course selected from the academic fields of Sophomore Mathematics, Foreign Language, or Physical Sciences. STAFF

ADVANCED COURSES

All students selected to continue Air Science pursue:

*First Year Advanced*

AS 101, 102. GROWTH AND DEVELOPMENT OF AEROSPACE POWER.—A study of development of air power in the United States; mission and organization of the Defense Department; Air Force concepts, doctrine and employment; astronautics and space operations; future development of aerospace power. 6 s.h. (W) OLDHAM

AS 203. THE PROBLEM OF FLIGHT AND APPLIED AIR SCIENCES OF WEATHER AND NAVIGATION are studied. Leadership Laboratory is required. 1 s.h. (W) SCHLÖGL

POLITICAL SCIENCE 121—Elements of International Relations. 3 s.h. (W) PROCTOR

AS 204. THE AIR FORCE OFFICER AND BRIEFING FOR COMMISSIONED SERVICE. Leadership Laboratory is required. 1 s.h. (W) SCHLÖGL

ECONOMICS 152—GLOBAL GEOGRAPHY. 3 s.h. (E) LANDON

## ART

ASSOCIATE PROFESSOR MUELLER, EXECUTIVE OFFICER; ASSOCIATE PROFESSOR MARKMAN, ACTING EXECUTIVE OFFICER; ASSOCIATE PROFESSOR BRODERSON, DIRECTOR OF UNDERGRADUATE STUDIES; VISITING BENJAMIN N. DUKE PROFESSOR BIER; PROFESSORS HALL AND PATRICK; ASSOCIATE PROFESSORS JENKINS AND SUNDERLAND; VISITING ASSISTANT PROFESSOR HANNEGAN; MR. STARS.

AESTHETICS

121. THE PRINCIPLES OF ART CRITICISM.—The development of criteria for making sound critical judgments based on analyses of painting, sculpture, architecture, and design. 3 s.h. (E) PATRICK

221-222. HISTORY OF AESTHETICS.—Theories of art and beauty in the western world from antiquity to the present. Some attention will be given the development theories of aesthetics in the Far East. 6 s.h. (E) PATRICK

HISTORY OF ART

1-2. INTRODUCTION TO ART HISTORY.—An historical survey of the development of architecture, sculpture, painting, and the minor arts as material manifestations of the culture of the western world from ancient to modern times, with some reference to primitive, Oriental, and other non-western culture; the vsiual arts as a record of a whole civilization. The course will provide the student with terminology and principles necessary to formation of judgment. Open only to freshmen; others, see Art 51-52. 6 s.h. (E & W) STAFF

51-52. INTRODUCTION TO ART HISTORY.—The aims of this course are identical with those of Art 1-2; the content and method are adapted to the capacities of upperclassmen. Not open to upperclassmen who have received credit for Art 1-2. 6 s.h. (E & W) STAFF

131. ART AND ARCHAEOLOGY OF THE HELLENIC WORLD.—After a preliminary treatment of the archaeological material from the Aegean, the geometric and orientalizing periods, the course deals with the architecture, sculpture and vase paintings of ancient Greece from archaic through Hellenistic times. 3 s.h. (W) MARKMAN

132. ROMAN ART AND ARCHAEOLOGY.—The course opens with a treatment of the archaeological background for the formation of the Roman style as derived from Etruscan, Greek, and indigenous Italian sources, and then deals with the architecture, sculpture and painting from the early republic to the end of the empire in Italy, and to some extent in the provinces. 3 s.h. (W) MARKMAN

133. MEDIAEVAL ARCHITECTURE.—A survey of Christian architecture in the Near East, the Balkans, Russia, and western Europe from the beginnings of the mediaeval style in the late classical period to its disintegration in the fifteenth century. 3 s.h. (E) MISS SUNDERLAND

134. MEDIAEVAL PAINTING AND SCULPTURE.—A study of painting, including mosaics, manuscripts, stained glass, and sculpture, in western Europe from the late classical period through the fourteenth century. 3 s.h. (E) MISS SUNDERLAND

136. NORTHERN RENAISSANCE ART.—A study of book illumination, panel painting, graphic arts, and sculpture as expressions of literary, religious, and philosophical ideas of the fifteenth and sixteenth centuries in the Low Countries, Germany, and France. Some emphasis will be placed on individual artists such as the Van Eycks, Van der Weyden, Bouts, Van der Goes, Bosch, Bruegel, Grünewald, and Dürer. 3 s.h. (E) MUELLER

137. ITALIAN RENAISSANCE PAINTING AND SCULPTURE.—This course traces the evolution of painting and sculpture in Italy from the beginning of the fifteenth century through the middle of the sixteenth. Special emphasis is placed on developments in Florence, Venice, and Rome. 3 s.h. (E) MISS JENKINS

140. SEVENTEENTH CENTURY PAINTING AND SCULPTURE IN EUROPE.—This course traces the evolution of the Baroque style in European painting and sculpture with some attention being given to related manifestations in the late sixteenth and early eighteenth centuries. Particular emphasis is laid on developments in Flanders, France, Holland, and Spain. 3 s.h. (E) MISS JENKINS

141. AMERICAN ART.—A survey of architecture, sculpture, and painting in America from the time of the first settlers to the present day, including a consideration of the contributions of the English, Dutch, French, and Spanish to the artistic heritage of the United States. 3 s.h. (E) PATRICK

143. THE HISTORY OF PRINTS AND DRAWINGS.—An historical and critical study of drawings and prints from the fifteenth century to the present with reference to functions, values, and relationships to other forms such as painting, sculpture, and the book. 3 s.h. (E) MUELLER

144. RENAISSANCE AND BAROQUE ARCHITECTURE.—A study of the development of Renaissance architecture in Italy from its beginnings in the fifteenth century in the works of Brunelleschi to its flowering in the seventeenth century Baroque works of Bernini and Borromini, along with a consideration of the spread of Italian Renaissance forms to north Europe in the sixteenth century and its development into a Baroque style in the seventeenth century. 3 s.h. (E) MISS SUNDERLAND

145-146. THE RISE OF CONTEMPORARY ARCHITECTURE.—A study of the sources and evolution of the architecture of today, from the eighteenth-century conflict between Romantic Historicism and Industrialism to the work of Gropius, LeCorbusier, Wright, and their successors. Credit for a single semester will be given only to seniors electing the course during their final semester. 6 s.h. (E) MISS HALL

147. PAINTING AND SCULPTURE IN THE EIGHTEENTH AND NINETEENTH CENTURIES.—An investigation of the development of painting from the final stages of the Baroque in the eighteenth century to the period of the

impressionist movement in the last decades of the nineteenth century. 3 s.h. (E) MISS SUNDERLAND

148. MODERN PAINTING AND SCULPTURE.—The history of European painting and sculpture from 1863 to the present day. The course investigates the rise of the anti-academic movements of Impressionism and Post-Impressionism in the latter half of the nineteenth century; their outgrowth in Cubism, Expressionism, and Surrealism; and the various abstract styles of the twentieth century. Particular emphasis is placed on such artists as Manet, Renoir, Cezanne, van Gogh, Gauguin, Seurat, Matisse, Picasso, Braque, and Klee. 3 s.h. (E) PATRICK

149. PRE-COLUMBIAN ART AND ARCHAEOLOGY.—A study of the architecture, sculpture, pottery, and other arts of the indigenous civilizations in Mexico, Central America, and the Andean region of South America before the Spanish conquest. 3 s.h. (W) MARKMAN

150. LATIN AMERICAN ART.—A study of the architecture, painting, and sculpture of Latin America from colonial times to the present. Particular emphasis will be placed on architecture of the colonial period in Mexico, Peru, and Brazil. The recent developments in mural painting in Mexico and architecture in both Mexico and Brazil will also be stressed. 3 s.h. (W) MARKMAN

191, 192. INDEPENDENT STUDY.—Open to highly qualified students by permission of the department. (See page 36).

FOR SENIORS AND GRADUATES

215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—A specialized study of the development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part of Syria and Palestine, to the Persian conquest. 3 s.h. (W) MARKMAN

216. RELIGIOUS ART OF THE CLASSICAL WORLD.—A specialized study of the religious art, particularly architecture and sculpture, of Greece and Rome, with special emphasis on the monuments in the Near East. 3 s.h. (W) MARKMAN

217. AEGEAN ART.—A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 3 s.h. (W) MARKMAN

218. EARLY GREEK ART.—A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 s.h. (W) MARKMAN

233. EARLY MEDIAEVAL ARCHITECTURE.—The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 s.h. (E) MISS SUNDERLAND

234. ROMANESQUE SCULPTURE.—The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 s.h. (E) MISS SUNDERLAND

Art 236. GOTHIC SCULPTURE.—The subject matter of this course for the spring semester of 1964 is "Tilmann Riemenschneider and the late Gothic German sculpture." This study focuses on the art of this late Gothic German sculptor whose work will be compared with that of other prominent artists of the period. 3 s.h. (E) BIER

239. ARCHITECTURE OF BRITAIN.—After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 s.h. (E) MISS HALL

240. ARCHITECTURE OF NORTH AMERICA.—A study illustrating the transplantation of European architectural customs since the sixteenth century; the time lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 s.h. (E) MISS HALL

292. RESEARCH PROBLEMS IN THE COLLECTIONS OF THE NORTH

CAROLINA MUSEUM OF ART.—A specialized study of selected art works in the collections of the North Carolina Museum of Art. Students will meet once every week in the museum in Raleigh. In completion of the course each student will submit a report on his particular research project. 3 s.h. (E) BIER

## DESIGN

*Students other than art majors may receive not more than eight semester hours credit for work in studio courses. For any number of semester hours of credit in studio courses an equal number of hours must be taken in History and Criticism. The Introductory courses 1L-2L or 51L-52L are prerequisite for all courses in Design.*

1L-2L. DESIGN LABORATORY.—This course aims to develop the student's visual faculty through practice with design elements and experience with media. Freshmen intending to elect further courses in Art are advised to carry this course concurrently with Art 1-2. Open only to freshmen enrolled in Art 1-2; others, see Art 51L-52L. 2 s.h. (E) BRODERSON

51L-52L. DESIGN LABORATORY.—The aims, content, and method of this course are similar to those of Art 1L-2L. Upperclassmen intending to elect further courses in Art are advised to carry this course concurrently with Art 51-52. Open only to upperclassmen enrolled in Art 51-52, and to those who have completed Art 1-2 or 51-52 without electing Design Laboratory. A senior in his last semester may receive credit for one semester. 2 s.h. (E) BRODERSON

53-54. BEGINNING STUDIO.—A studio course offering experiment and practice with formal elements of composition in various media. Particular emphasis will be given to drawing; watercolor, collage, and three-dimensional media will be secondarily considered. 4 s.h. (E) BRODERSON

55, 56. PAINTING.—A studio course designed to give experience in painting media with individual and group criticism, and discussion of important historic or contemporary ideas in painting as related to student work. Prerequisite: Art 53-54 or consent of the instructor. 4 s.h. (E) BRODERSON

157, 158. ADVANCED PAINTING.—Emphasis is given to the techniques of various painting and design media. Prerequisite: 55, 56. 4 s.h. (E) BRODERSON

159, 160. PRINTMAKING.—This course presupposes a knowledge of design and skill in drawing. Practice in wood engraving; block printing; and in copperplate engraving, etching, acquatint, and drypoint. Reference will be made to prints in relation to the design of the book, and historic examples of the art of the print will be analyzed in the study of these techniques. Prerequisite: 53-54. 4 s.h. (E) MUELLER

## DEPARTMENTAL MAJOR IN ART

*Prerequisite:* Introduction to Art History (1-2 or 51-52); or, with the approval of the Director of Undergraduate Studies, equivalent hours in 100 level courses which form a background for the History of Art.

*Major Requirements:* The student will select in consultation with the departmental adviser a sequence of courses emphasizing either the History of Art or Design.

*a.* History of Art: 24 semester hours from 100 and 200 level courses distributed over the entire field of Art History, and a concentration of courses in at least two areas.

*b.* Design: 22 semester hours, of which 16 must be in Design and 6 from courses in the History of Art and Theory.

*Related Work:* 18 semester hours elected from courses in aesthetics, anthropology, English, German, Greek, Latin and Roman Studies, history, history of music, history of religion, linguistics, philosophy, psychology, Romance Languages, and sociology.

The Department offers work leading to graduation with distinction. See the Section on honors in this *Bulletin*.

## BIOLOGY

See courses listed under Botany and Zoology.

## BOTANY

ASSOCIATE PROFESSOR JOHNSON, CHAIRMAN; ASSOCIATE PROFESSOR HUMM, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR CULBERSON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS ANDERSON, BILLINGS, HARRAR, KRAMER, NAYLOR, OOSTING, AND PERRY; ASSOCIATE PROFESSORS PHILPOTT AND WILBUR; ASSISTANT PROFESSORS STONE AND WHITE; AND ASSISTANTS

1. GENERAL BOTANY.—An introduction to the structure and life-processes of seed plants and the environmental factors influencing their distribution. Laboratory, discussions, and field trips. 4 s.h. (W & E) STAFF

2. GENERAL BOTANY.—An introduction to reproduction, heredity, and identification with emphasis on flowering plants; and an introduction to the microflora important in biological communities. Prerequisite: Botany 1. 4 s.h. (E & W) STAFF

52. PLANT IDENTIFICATION.—Practice in the identification of local plants and a study of the principles underlying plant classification. Laboratory, lectures, and field trips. Prerequisite: one year of botany. 4 s.h. (W) WILBUR

55. STRUCTURE OF VASCULAR PLANTS.—A detailed study of the vegetative and reproductive tissues of seed plants; and a survey of the several groups of vascular plants emphasizing relationships of body structures. Prerequisite: one year of botany. 4 s.h. (W) WHITE

101. PRINCIPLES OF HEREDITY.—The basic principles of heredity and their significance. Lectures, three hours; laboratory, two hours; conference, one hour. Laboratory work includes experimental breeding of the fruit fly. May be taken as a lecture course without laboratory. Prerequisite: one (high-school or college) course in biology, botany, or zoology. High-school algebra or one year of college mathematics recommended. 3 (without laboratory) or 4 s.h. (W) PERRY

103. GENERAL BACTERIOLOGY.—A study of the morphology and fundamental physiological processes of bacteria: their relationship to sanitation, public health, soil fertility, and food preservation. Prerequisite: one year of botany or zoology, or equivalent. 4 s.h. (W) HUMM

104. THE STRUCTURE AND IDENTIFICATION OF LOWER PLANTS.—A study of representative examples of algae, fungi, mosses and liverworts, including collection, identification, and classification of common forms. Offered in alternate years. Prerequisite: one year of botany. 4 s.h. (W) ANDERSON

151. INTRODUCTORY PLANT PHYSIOLOGY.—The principal physiological processes of plants, including water relations, synthesis and use of foods, and growth phenomena. Prerequisite: Botany 1, 2 or equivalent; one year of chemistry recommended. 4 s.h. (W) KRAMER

156. PLANT ECOLOGY.—Principles of the relationships between plants and their environment. The structure and processes of typical ecosystems. Laboratory, lectures, and field trips. Prerequisites: Botany 1, 2 and 52, or equivalent. 4 s.h. (W) BILLINGS

202. GENETICS.—The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. Offered in alternate years. Prerequisites: one year of botany or zoology, or equivalent, and one year of college mathematics. 4 s.h. (W) PERRY

203. PLANT CYTOLOGY.—A study of the structure and organization of plant cells in relation to growth, reproduction and especially heredity. Offered jointly with zoology. Prerequisite: one year of botany. 4 s.h. (W) ANDERSON

204. ANATOMY AND MORPHOLOGY OF VASCULAR PLANTS.—A study of vegetative and reproductive tissues of vascular plants including selection and prepa-

ration of fresh plant materials. An analysis of some of the significant literature bearing upon function, development, ecology, and phylogeny. Prerequisite: Botany 55 or equivalent. 4 s.h. (w) WHITE

221. INTRODUCTORY MYCOLOGY.—Field and laboratory study of the vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: One year of biological science. 4 s.h. (w) JOHNSON

225-226. SPECIAL PROBLEMS.—Students with adequate training may do special work in the following fields:

1. MYCOLOGY AND PLANT PATHOLOGY. JOHNSON
2. CYTOLOGY. ANDERSON
3. ECOLOGY. OOSTING AND BILLINGS
4. GENETICS. PERRY
5. MORPHOLOGY AND ANATOMY OF HIGHER GROUPS. PHILPOTT AND WHITE
6. MORPHOLOGY AND TAXONOMY OF LOWER GROUPS. ANDERSON, HUMM AND CULBERSON
7. PHYSIOLOGY. KRAMER AND NAYLOR
8. TAXONOMY OF HIGHER GROUPS. WILBUR
9. MICROBIOLOGY. HUMM
10. EXPERIMENTAL TAXONOMY AND EVOLUTION. STONE

240. PLANT EVOLUTION.—Microevolutionary change and factors influencing its rate and direction, with primary emphasis on examples from the plant world. 3 s.h. (w) STONE

252. PLANT METABOLISM.—The physiochemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) NAYLOR

254. PLANT WATER RELATIONS.—A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 s.h. (w) KRAMER

255. TAXONOMY.—A study of the historical background of plant taxonomy, modern concepts and systems of classification, nomenclatorial problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 s.h. (w) WILBUR

256. COMMUNITY ANALYSIS AND CLASSIFICATION.—The development of concepts and methods in synecology leading to present applications of theory and field techniques. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) OOSTING

257. PRINCIPLES OF PLANT DISTRIBUTION.—Interpretations of floristic and ecological plant geography of world vegetation. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) BILLINGS

258. PHYSIOLOGY OF GROWTH AND DEVELOPMENT.—Consideration of the internal factors and processes leading to the production of new protoplasm and its differentiation at the cellular, tissue, and organ level in plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) NAYLOR

259. THE ENVIRONMENT.—Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) BILLINGS

260. LICHENS.—The morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 2 s.h. (w) CULBERSON

MARINE LABORATORY.—Botany 211, *Marine Algae,* and 207, *Marine Mycology,* are given alternate years at the Duke University Marine Laboratory, Beaufort, N. C. Consult the *Bulletin of the Marine Laboratory.*

### FOREST BOTANY

253. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisite: one year of botany. 3 s.h. (w) HARRAR

### DEPARTMENTAL MAJOR

*Prerequisites:* Botany 1 and 2.

*Major Requirements:* A minimum of 21 hours (B.S., 24 hours) of work including at least eight hours from each of the two following groups of courses: Group 1—Botany 52, 104 and 156; Group 2—Botany 55, 101, 103, and 151. The remaining hours may be selected from these groups and any other courses in the Department for which the student is eligible, subject to the approval of the Departmental Adviser. Forestry 257 may be counted toward a major in Botany.

*Related Work:* Courses in at least two natural science departments sufficient to total, with major work, 42 s.h. (B.S., 48 s.h.).

## CHEMISTRY

PROFESSOR SAYLOR, CHAIRMAN; PROFESSOR WILDER, DIRECTOR OF UNNDERGRADUATE STUDIES; ASSISTANT PROFESSOR BONK, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BRADSHER, BROWN, GROSS, HAUSER, HILL, HOBBS, AND KRIGBAUM; ASSOCIATE PROFESSORS POIRIER, QUIN, SMITH, AND STROBEL; ASSISTANT PROFESSORS JONES, TOREN AND WELLS; AND ASSISTANTS

1, 2. GENERAL INORGANIC CHEMISTRY.—Lectures and recitations on the elementary principles of chemistry and on the structure, properties, preparation and uses of the elements and their compounds. The laboratory work includes qualitative analysis of some of the more common metals. One lecture, two recitations, and three laboratory hours, throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. 8 s.h. (E & W) BONK, STAFF AND ASSISTANTS

42. INTRODUCTION TO CHEMICAL ANALYSIS.—An intensive study of solutions of electrolytes with special reference to chemical equilibrium. Laboratory experiments illustrate the principles of chemical equilibrium and the techniques of quantitative analysis. Credit is not given for both Chemistry 2 and 42 nor for both 42 and 61. One lecture, one recitation and six laboratory hours. Prerequisites: Permission of the Director of Undergraduate Studies, Chemistry 1, and Mathematics 21. 4 s.h. (w) WILDER AND STROBEL

61. FUNDAMENTALS OF ANALYTICAL CHEMISTRY.—A study of the reactions of electrolytes in solution and of chemical equilibrium illustrated by laboratory experiments involving the techniques of gravimetric, volumetric, chromatographic, and colorimetric analysis. One lecture, one recitation, and six laboratory hours. Prerequisites: Chemistry 1, 2 and Mathematics 21 or equivalent. 4 s.h. (w) WILDER, JONES, POIRIER, TOREN AND ASSISTANTS

65. INORGANIC CHEMISTRY.—A study of the more familiar elements and their compounds in the light of modern theories of valence and molecular structure. Three recitations. Prerequisite: Chemistry 42 or 61. 3 s.h. (w) WELLS

70. QUANTITATIVE ANALYSIS.—A study of the theory and techniques of inorganic gravimetric and volumetric analysis. One lecture, one recitation, and six laboratory hours. Not open to B.S. Chemistry majors. Prerequisite: Chemistry 42 or 61. 4 s.h. (w) TOREN, WELLS AND ASSISTANTS

132. QUANTITATIVE AND INSTRUMENTAL ANALYSIS.—Practice in advanced quantitative analysis and in the use of physical instruments in analysis with special attention to optical devices, together with a discussion of theoretical aspects. One lecture and six laboratory hours. Prerequisites: Chemistry 42 or 61 and Physics 41-42, the latter half of which may be taken concurrently. 3 s.h. (w) TOREN

151, 152. ORGANIC CHEMISTRY.—An introduction to the study of the com-

pounds of carbon in which the chemistry of aliphatic and aromatic compounds is considered. Laboratory experiments are selected to illustrate the more important reactions and preparations of organic compounds. Two lectures, one recitation, and three laboratory hours. Prerequisite: Chemistry 42 or 61. Chemistry 151 is prerequisite for 152. 8 s.h. (w) BRADSHER, MISS BROWN, QUIN, WILDER, AND ASSISTANTS

161, 162. PHYSICAL CHEMISTRY.—Fundamentals of general theoretical chemistry illustrated by selected laboratory experiments. Three recitations and three laboratory hours. Prerequisites: Chemistry 152; Physics 41-42 and Mathematics 63 or equivalent. 8 s.h. (w) HOBBS AND SMITH

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Director of Undergraduate Studies. (See page 36).

206. ELEMENTS OF THEORETICAL CHEMISTRY.—A one semester course in the general principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitation and three laboratory hours. Prerequisite: Chemistry 70, 152, Physics 41-42, and Mathematics 22. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 s.h. (w) SAYLOR AND JONES

215. ADVANCED INORGANIC CHEMISTRY.—A study of modern theories of valence and molecular structure and of inorganic compounds, particularly the less common types. Prerequisites: Chemistry 161-162 or 206. 3 s.h. (w) HILL

216. NUCLEAR CHEMISTRY.—Elementary theory of nuclear reactions, properties of isotopes, and tracer techniques. Two lectures and three laboratory hours. Prerequisites: Chemistry 70 or 132, 152 and Physics 41-42. 3 s.h. (w) HILL AND TOREN

234. CHEMICAL INSTRUMENTATION.—Discussion of physiochemical principles as applied to instrumental methods of analysis, illustrated by laboratory experiments with emphasis on methods involving electrical techniques. One lecture and three laboratory hours. Prerequisite: Chemistry 70 or 132 and either 161-162 or 206; either of the latter may be taken concurrently. 2 s.h. (w) STROBEL

251. QUALITATIVE ORGANIC ANALYSIS.—Systematic identification of organic compounds, including a study of solubilities and classification reactions. One lecture and six laboratory hours. With permission of the Director of Graduate Studies, graduate students may take three hours of laboratory work and receive 2 semester hours credit. Prerequisite: Chemistry 152. 3 s.h. (w) HAUSER

252. ADVANCED ORGANIC PREPARATIONS.—A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory exercises accompanied by discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture with lectures in alternate weeks. Prerequisite: Chemistry 152. 2 s.h. (w) MISS BROWN

253. INTERMEDIATE ORGANIC CHEMISTRY.—An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: Permission of the Director of Undergraduate Studies and 8 s.h. of organic chemistry. 3 s.h. (w) BRADSHER AND WILDER

271. INTRODUCTION TO RESEARCH.—Lectures on the use of chemical literature, research methods, recording and publication of results, and other topics. One lecture. 1 s.h. (w) MISS BROWN

275-276. RESEARCH.—The aim of this course is to give instruction in methods used in the investigation of original problems. It is open to seniors by permission of the Director of Undergraduate Studies. 1 to 3 s.h. (w) STAFF

## DEPARTMENTAL MAJOR

A. For the degree of A.B.

*Prerequisites:* Chemistry 1, 2, Mathematics 21, 22.

*Major Requirements:* 22 s.h., including Chemistry 61, 70, 151, 152, and an addi-

tional 6 to 8 s.h., which may be satisfied by 161-162 or 206 together with 2 or 3 s.h. selected from courses 216, 234, 251, and 252.

*Related Work:* 20 s.h., including Physics 41-42 with the remainder usually in botany, geology, mathematics, physics or zoology.

B. For the degree of B.S.

*Prerequisites:* Chemistry 1, 2 or 1, 42, Mathematics 21, 22, 63.

*Major Requirements:* Chemistry 61, 65, 132, 151, 152, 161, 162, 251, 271, 216 or 234 or 252.

*Related Work:* 18 s.h., including Physics, 11 s.h. and Mathematics 64 or 131 or 221.

The language requirements must be satisfied by German and either French or Russian.

The department offers work leading to graduation with distinction. Consult the section on Honors and Prizes in this *Bulletin*.

## CLASSICAL STUDIES

PROFESSOR ROGERS, CHAIRMAN, DIRECTOR OF UNDERGRADUATE STUDIES IN LATIN; PROFESSOR TRUESDALE, DIRECTOR OF UNDERGRADUATE STUDIES IN GREEK; PROFESSOR WILLIS; ASSISTANT PROFESSORS SETTLE AND WOMBLE; INSTRUCTORS STANLEY AND WOOLEY

### GREEK

Courses 15, 121, 122, 131, 141, 142, 151 are entirely in English and require no knowledge of the Greek language. The purpose in offering them is to give a wider circle of students some conception of the debt which modern civilization owes to the Greeks.

1-2. COURSE FOR BEGINNERS.—Open to all students. 6 s.h. (W) WOOLEY

15. MYTHOLOGY.—A study of Greek mythology and the use made of it in art and English literature. No knowledge of the Greek language is required. Open to freshmen as an elective in either semester. 3 s.h. (E & W) TRUESDALE AND WOOLEY

63-64. INTERMEDIATE GREEK.—Intensive review of fundamentals with emphasis on development of comprehensive reading ability. Selections from Herodotus, Xenophon, and Lysias. Open to students who have completed courses 1-2. 6 s.h. (W) STANLEY

105-106. HOMER.—*Iliad,* Books I-III. PLATO.—*Apology* and *Crito*. Open to students who have completed courses 1-2 and 63-64 or their equivalent. 6 s.h. (W) TRUESDALE

107-108. EURIPIDES.—*Medea.* SOPHOCLES.—*Oedipus Tyrannus.* ARISTOPHANES.—*Clouds.* Open to students who have completed the required preliminary work. 6 s.h. (W) TRUESDALE

117-118. GREEK PROSE COMPOSITION.—The character of this course is determined by the needs of the students enrolled. 3 s.h. (W) TRUESDALE

121, 122. GREEK LITERATURE IN ENGLISH TRANSLATION.—The purpose of this course is to give a general survey of the life and civilization of the Greeks, especially to those who have never studied the language but wish to become acquainted with some of the choicest portions of the literature by the use of translations. It is, however, open as an elective to all juniors and seniors, whether or not they know Greek. First, the *Iliad* and the *Odyssey* are read in translation and illustrated with stereopticon views of the excavations and discoveries at Troy and other cities of the Aegean age; then, many of the extant plays of the three great tragic poets are studied in English translation. 6 s.h. (E & W) TRUESDALE AND STANLEY

*Students may elect course 122, whether or not they have taken course 121.*

131. HISTORY OF GREECE.—The history of the Greek world from the Late Bronze Age to the Macedonian conquest. Open to seniors, juniors, and (by arrangement) sophomores. No knowledge of Greek is required. 3 s.h. (E) WOOLEY

141, 142. GREEK ART.—Open to seniors, juniors, and sophomores. A comprehensive survey of the development of Greek architecture and Greek sculpture in all periods. Course 141 is opened by a preliminary account of Egyptian, Mesopotamian, and Aegean artistic backgrounds. Course 142 is devoted chiefly to Greek art of the greatest period with the main emphasis on sculpture, and may be elected independently of course 141. All lectures are fully illustrated by slides. No knowledge of Greek is required. 6 s.h. (E) STANLEY

151. GREEK ARCHAEOLOGY.—A general treatment of the subject, with emphasis upon the value of archaeological discovery as evidence of the artistic development of the Greek people. The course includes a survey of the various archaeological sites. Open to seniors, juniors, and (by arrangement) sophomores. 3 s.h. (E) STAFF

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. See page 36.

## LATIN

Students who wish by study in English to make acquaintance with Roman antiquity from either a literary or an historical approach are afforded that opportunity through the courses in translated Latin Literature (111, 112), and Roman History (131, 132).

1-2. COURSE FOR BEGINNERS.—Forms, vocabulary, pronunciation, and syntax, with reading of easy Latin prose. The effort is made to promote rapid development of the ability to read Latin with satisfaction. 6 s.h. (E) WILLIS

63. CICERO'S ORATIONS.—Selected orations of Cicero are read with attention to prose style. Prerequisite: Latin 1-2, or equivalent. 3 s.h. (E) SETTLE AND WOOLEY

64. VERGIL'S AENEID.—Selections are read and interpreted, with due attention to prosody, and discussion of the literary excellence of the work. 3 s.h. (E) SETTLE AND WOOLEY

91. LATIN PROSE.—Selections from prose authors or Cicero's *De Senectute* and *De Amicitia,* or selected books of Livy's history, with special emphasis on developing competence in reading Latin. 3 s.h. (E) SETTLE AND STANLEY

92. LATIN POETRY.—Selections from the greatest Latin poets, especially Horace's *Odes.* 3 s.h. (E) SETTLE AND STANLEY

97. SIGHT READING IN CLASSICAL LATIN.—One period of an hour per week devoted to practice in the reading of Latin of the classical period; designed to train students to read with facility. 1 s.h. (E) WILLIS

98. SIGHT READING IN MEDIAEVAL LATIN.—One period of an hour per week devoted to reading interesting mediaeval prose and poetry. Prerequisite: at least one of the following courses: Latin 63, 64, 91, 92, and 97, or an equivalent. 1 s.h. (E) WILLIS

101. TACITUS.—Interesting and historically important selections from the *Annals* or the *Histories* of Tacitus are read, with attention to the literary style and the value of the historical narrative. 3 s.h. (E) SETTLE

102. JUVENAL.—Juvenal's literary satire forms the basis of the course. 3 s.h. (E) SETTLE

103. CICERO.—Selections from one of the major philosophical works, with attention to Cicero's philosophical thought and literary style. 3 s.h. (E) ROGERS

104. LUCRETIUS.—A study of Lucretius as a philosophical thinker and as a poetic artist. 3 s.h. (E) ROGERS

105-106. LATIN PROSE COMPOSITION.—Recommended to students who are pursuing courses 63, 64, 91, 92, and 97, and may at the discretion of the instructor be required of such students. 4 s.h. (E)

111, 112. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selective readings in Latin literature in English translation with emphasis on the drama, lyric poetry, and the varied contributions of Cicero to literature in the first term,

and upon the epic, the satire, and the novel in the second semester. (No language credit.) 6 s.h. (E) WOMBLE AND SETTLE

131, 132. HISTORY OF ROME.—A survey of the history of the Roman State from its beginnings to the death of Justinian; its expansion; development of its constitution and public administration; social, legal, political and economic problems of perennial life and interest; the background and setting of Christianity's rise and growth. (This course carries no language credit. No knowledge of Latin is required for admission.) 6 s.h. (E) ROGERS

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. See page 36.

211-212. ROMAN ORATORY.—A reading course in the history and development of Roman oratory, based for the most part on Cicero's *Brutus* and the *Dialogus* of Tacitus. 6 s.h. (E) ROGERS

### DEPARTMENTAL MAJOR IN GREEK

*Prerequisite:* Greek 1-2.

*Major Requirements:* 24 semester hours, including the following courses: Greek 63-64, 105-106, 107-108, 117-118, and 131.

*Related Work:* Eighteen semester hours, selected usually in Latin, linguistics, philosophy, art, and English.

### DEPARTMENTAL MAJOR IN LATIN

*Prerequisite:* Latin 1-2, 63-64, or equivalent.

*Major Requirements:* 24 semester hours which must include courses 91, 92, 101, 102, 103, 104, and 6 semester hours in courses at the 200-level.

*Recommended Courses:* Latin 105-106, Composition, and 131, 132, Roman History.

*Related Work:* Eighteen hours of related work, elected usually in Greek, linguistics, philosophy, art, Romance Languages, and English. Majors who contemplate graduate work are reminded of the necessity of Greek, German, and French for such study.

*Graduates of Duke University may attend the American School of Classical Studies at Athens, Greece, without charge for tuition and are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology and one in the language, literature, and history of ancient Greece, each with a stipend of $2,000. They are awarded mainly on the basis of examinations held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.*

COLLOQUIUM 101, 102.—See *Honors-Masters Program* on pages 37 and 94 of this *Bulletin.*

## COMPARATIVE LITERATURE

The courses in Comparative Literature may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major work is offered in Comparative Literature. Students interested in the study of the interrelationships of literature as a part of their undergraduate program, or as preparation for graduate work, should consult Mr. Salinger.

191, 192. INDEPENDENT STUDY.—Open only to qualified students by permission of Mr. Salinger. See p. 36. SALINGER

201, 202. ROMANTICISM.—Studies in the origin, rise and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany, with some reference to other countries. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. SALINGER

203, 204. REALISM AND SYMBOLISM.—Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy,

tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. SALINGER

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind, Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 3 s.h. SALINGER

For a description of the following courses see the departmental listing.

READINGS IN EUROPEAN LITERATURE (English 153, 154). HENINGER

MODERN EUROPEAN DRAMA (English 155) REARDON

RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE (Religion 187). WHITE

## ECONOMICS AND BUSINESS ADMINISTRATION

PROFESSOR DE VYVER, CHAIRMAN; PROFESSOR SMITH, ACTING CHAIRMAN, SECOND SEMESTER 1963-64; PROFESSOR JOERG, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BLACK, DICKENS, FERGUSON, HANNA, HOOVER, LANDON, MCGEE, SAVILLE, AND SPENGLER; ASSOCIATE PROFESSORS BLACKBURN, DAVIES, GERHARD, GOODWIN, KELLER, KREPS, SHIELDS, AND YOHE; ASSISTANT PROFESSORS DE ALESSI, ETTIN, FOLSOM, NAYLOR, AND WALLACE; INSTRUCTOR PETHIA; VISITING ASSISTANT PROFESSORS (PART-TIME) GALIFIANAKIS, AND HAHN, MRS. BIEHN, MISS MURPHY, MESSRS. BORCHERDING, AND RUTMAN

The courses offered by the Department are listed under three divisions, Economics, Accounting, and Business Administration.

In general, the Economics courses aim to develop in the student such critical and analytical skills as underlie the ability to understand economic problems and institutions, both in their contemporary and in their historical setting. While no particular vocational or professional goal is emphasized, these courses furnish the academic background necessary for many positions in industry, for work in the economic branches of government service, and for graduate study in economics and the social sciences.

Courses in Accounting and Business Administration, although more concerned with general principles than with specific applications, stress in greater measure than courses in Economics the knowledge and techniques useful to students definitely preparing for business careers. The student who majors in Accounting may elect courses in accountancy, business law, and related work, sufficient to quality for admission to C.P.A. examinations.

Economics 1, 2 or 51-52 must be passed by all students planning to elect further courses in Economics and Business Administration.

### ECONOMICS

1. INTRODUCTION TO ECONOMIC PROBLEMS AND POLICIES.—The present-day American economy and the challenge from centrally planned economies; policies to deal with problems of depression, inflation, growth, and automation. 3 s.h. (E & W) (Open only to Freshmen.) STAFF

2. THE EVOLUTION OF ECONOMIC IDEAS.—A study of man's economic activities and his ideas about them, from the ancient world to the present day. Emphasis is given to the historical roots of important contemporary economic ideologies. 3 s.h. (E & W) (Open only to Freshmen.) STAFF

51-52. PRINCIPLES OF ECONOMICS.—First semester, Macroeconomics: Preview of American economy, national income accounting and determination of national income and output; fluctuation and growth of output, monetary and fiscal policies for stability and growth. Second semester, Microeconomics: Output, cost, and pricing of business firms under varying market conditions; distribution of national output; problems of business, labor, and agriculture; international trade and economic development. 6 s.h. (E & W) STAFF

103. TRANSPORTATION.—Essential features, problems, and competitive posi-

tions of rail, highway, air, and inland-water transportation, with most emphasis on rail transportation. Special attention is given to the economic significance of transportation, and to cost factors, rates and their economic effects and regulations. 3 s.h. (w) LANDON

132. THE ECONOMIC HISTORY OF THE UNITED STATES.—Development of economic institutions as the United States passed from a wilderness area to an industrial society. Special attention is given to measures of economic change and their application to models of economic growth and fluctuation. 3 s.h. (w) SAVILLE

149. THE THEORY OF THE FIRM.—Cost and supply considerations in price theory, the demand for factors of production. The allocation of resources is examined in the context of competitive and monopolistic market structures. 3 s.h. (w) DE ALESSI

150. ECONOMIC THOUGHT SINCE ADAM SMITH.—A course of readings in leading economic writers of the nineteenth and twentieth centuries. 3 s.h. (w) GOODWIN

152. GLOBAL GEOGRAPHY.—The subject matter involves resources patterns and world affairs, geonomic problems, geocultural problems, and geographic factors affecting geopolitical questions. 3 s.h. (E) LANDON

153. MONEY AND BANKING.—The lender's side of financial markets. The activities of commercial banks and other financial institutions in supplying loanable funds and the effects of these activities on the money supply and its rate of use, the impact of central bank and Treasury operations on financial markets, and the evolution of the present monetary system and its institutions. 3 s.h. (w) YOHE, ETTIN

154. AGGREGATIVE ECONOMICS.—Concepts and measurement of national income and expenditures, employment, and price levels; the theoretical determination of these aggregates; and applications of macro-economic theory to business cycles and economic growth. 3 s.h. (w) YOHE

155. LABOR PROBLEMS.—An examination of present-day labor problems followed by an intensive study of methods used by employers and workers in meeting those problems. 3 s.h. (w) DE VYVER; MRS. KREPS

160. THE POLITICAL ECONOMY OF EUROPE: RECENT DEVELOPMENTS.—A study of changing economic relations between European countries and of the changing position of Europe in the world economy after World War II. Selected topics of an interdisciplinary nature will be discussed by visiting lecturers. (w) GERHARD

161. EUROPEAN ECONOMIC PROBLEMS.—An application of the theory of international economics to the problems of international economic integration with emphasis on the European Common Market. 3 s.h. (w) GERHARD

169. ECONOMICS OF CONSUMPTION.—Economic problems of the family. Factors determining choice; commercial and legal standards for consumer's goods; consumer credit and co-operation; income and standards of living. 3 s.h. (w) MRS. KREPS

189. BUSINESS AND GOVERNMENT.—A survey of the public policies which most directly affect the operation of competition in the business world. The course considers the leading philosophies of public control and economic development, the validity of their presuppositions, and their influence on legislation, court decisions and administrative law. 3 s.h. (w) FOLSOM; MCGEE

201. SENIOR SEMINAR IN ECONOMICS.—Problems in theory and applied economics. Readings, reports, and discussion of selected topics. For majors in Economics, with consent of the Department. 3 s.h. (w) STAFF

204. ADVANCED MONEY AND BANKING.—Monetary theory and its statistical and institutional implementation. Particular attention is given to the development of aggregative theories of prices, interest rates and production; the functioning of monetary policy within various theoretical frameworks; and appraisal of the recent use and the limitations of Federal Reserve policy. 3 s.h. (w) YOHE

218. BUSINESS CYCLES.—The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories; modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 s.h. (w) YOHE

219. ECONOMIC PROBLEMS OF UNDER-DEVELOPED AREAS.—Consideration and analysis of the economic and related problems of under-developed countries. Some attention will be given to national and international programs designed to accelerate the solution of these problems. 3 s.h. (w) SPENGLER

231. ECONOMIC HISTORY OF EUROPE.—The economic development of Europe from medieval times to the present, treating such topics as the guilds mercantilism, money, banking, crises, the Industrial Revolution, the interrelationships of government and business, and the economic consequences of war. 3 s.h. (w) SMITH

233. STATE AND LOCAL FINANCE.—A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. Prerequisite: Economics 287 or consent of instructor. 3 s.h. (w) DAVIES

237, 238. STATISTICAL METHODS.—A study of statistical methods appropriate for dealing with problems in business and social science. In addition to developing more thoroughly the subject considered in *Business Statistics,* the following methods will be considered: simple, multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the instructor. *Either semester* may be taken for credit. 6 s.h. (w) HANNA AND WALLACE

243. MATHEMATICAL ECONOMICS.—A systematic survey of mathematical economic theory. The principal topics are vector spaces and matrices, macrostatics, especially input-output systems, and microstatics, especially models of the firm employing game theory and activity analysis. 3 s.h. (w) FERGUSON

244. INTRODUCTION TO ECONOMETRICS.—The implementation of economic theory by statistical testing and estimation. The course is composed of lectures on statistical theory for linear systems and of a workshop in applied econometrics. Data processing and programming for digital computor is studied, and the class participates in solution of a problem by use of computor. Prerequisite: Mathematics 221 and the consent of the instructor. 3 s.h. (w) FERGUSON

257. DYNAMICS OF THE LABOR MOVEMENT.—A study of the forces which have shaped the growth of the labor movement. Special emphasis on the origin of modern trade unionism, relating its growth with western philosophic developments, and with the changing economic and social structure of society in Europe and America. 3 s.h. (w) GOODWIN

262. TRADE UNIONISM AND COLLECTIVE BARGAINING.—An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. Prerequisite: Economics 155 or equivalent. 3 s.h. (w) DE VYVER

265. INTERNATIONAL TRADE AND FINANCE.—A study of fundamental principles of international economic relations. Subjects covered include the economic basis for international specialization and trade, and the economic gains from trade, the balance of international payments, problems of international finance, of international investments and international monetary problems. 3 s.h. (w) GERHARD

268. COMPETITION AND MONOPOLY.—A detailed study of the varieties of imperfectly competitive markets, the economic and legal issues which they raise, and the policy solutions which have been attempted in the United States. 3 s.h. (w) MCGEE

286. LATIN AMERICAN ECONOMICS.—A survey of the problems of economic development in twenty countries. 3 s.h. (w) SMITH

287. PUBLIC FINANCE.—An analysis of the impact of governmental expenditures, revenues, and debt on the allocation of resources, the redistribution of income, and the stabilization of income. 3 s.h. (w) DAVIES

293. ECONOMIC SYSTEMS.—A study of alternative economic systems. An historical and analytical study of the basic elements of capitalism and of collectivist types of economic systems. Particular attention is given to an analysis of the economic system of Soviet Russia. Prerequisite: permission of the department. 3 s.h. (w) HOOVER

294. ECONOMIC FUNCTIONS OF THE STATE.—A continuation of Economics 293. A consideration of the economic functions of society and of the contrasting roles of the state in the various economic systems in carrying on these functions. The Nazi system, the quasisocialized economics of Europe, as well as the modifications of old-style capitalism in the United States are analyzed. Prerequisite: Economics 293. 3 s.h. (w) HOOVER

## ACCOUNTING

57. PRINCIPLES OF ACCOUNTING I.—Provides a basic knowledge of accounting and a consideration of financial statements. Attention is focused on the nature and purpose of accounting, the measurement and classification of economic data, and accounting reports as a tool of management and the investor. 3 s.h. STAFF

58. PRINCIPLES OF ACCOUNTING II.—Concerned with the problems of accounting for the control of monetary assets and costs, the problems of capital stocks and the elementary problems of decision making. The relationship of the firm and national income accounts is examined. Prerequisite: Economics 57. 3 s.h. STAFF

147. ACCOUNTING FOR CONTROL.—This course traces the ways and means of executive control through statistics and industrial accounting. Emphasis is placed upon controlling business enterprises through cost accounting, financial reports, and other techniques. This course is not open to accounting majors. Prerequisite: Economics 57-58. 3 s.h. (w) BLACK AND JOERG

171. ACCOUNTING THEORY.—Basic concepts, principles and postulates are examined and related to the objective of income determination and asset valuation. Financial statements as a source of economic data and investor information are the focal points of the course. Prerequisite: Economics 58. 3 s.h. (w) KELLER

172. CORPORATE ACCOUNTS.—Deals with the complex problem of capital structure and debt. Considers in detail the effect of fluctuation in the purchasing power of the dollar on business affairs. Examines critically the many faceted problem of measuring and appraising business performance. Studies the many aspects of business combinations and foreign operations. Prerequisite: Economics 171. 3 s.h. (w) KELLER

178. ACCOUNTING SYSTEMS.—A presentation of the design and use of basic accounting procedures as applied to specialized business needs. Field trips to selected business units will be arranged. Prerequisite: Economics 171, 172 and the permission of the department. 3 s.h. (w) DICKENS

180. GOVERNMENTAL ACCOUNTING.—Accounting principles and methods used in the control and administration of governmental units. Emphasis is placed upon state, county and municipal governments. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (w) SHIELDS

273, 274. AUDITING, THEORY AND PRACTICE.—A study of basic auditing objectives, standards, ethics, terminology, procedures and reports. Accounting principles and statement presentation are studied from the viewpoint of the auditor. The place and responsibility of both the internal auditor and the public auditor are studied. Prerequisite: Economics 171, 172 and permission of the department. 6 s.h. (w) DICKENS

275, 276. ADVANCED INDUSTRIAL ACCOUNTING AND MANAGEMENT.—A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices fol-

lowed by job-order, process, and standard costing as well as the economics of overhead costs. Prerequisites: Economics 171, 172 and permission of the department. 6 s.h. (W) BLACK

277. INCOME TAX ACCOUNTING.—Presentation of the principles of Federal Income Tax laws as related to individuals, partnerships, estates, trusts and corporations. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (W) SHIELDS

278. ADVANCED PROBLEMS IN INCOME TAXATION.—A critical appraisal of selected topics in the law of income taxation as it relates to corporations, partnerships, estates, and trusts. 3 s.h. (W) KELLER

279. BUDGETING AND CONTROL.—A consideration of methods used in period and project budgeting; the use of accounting, statistical, and mathematical methods in cost control; the use of numerical data in making decisions among alternative courses of action. 3 s.h. (W)

295, 296. ADVANCED ACCOUNTING SEMINAR-THEORY AND PRACTICE.—Thorough practice in classroom to prepare candidates for the Certified Public Accountant examination. The object is to train students to apply accounting principles and to work in classroom under substantially the same conditions as in the examination rooms. Practical accounting problems, auditing analysis and theory of accounts. Prerequisite: Economics 171, 172 and permission of the department. 6 s.h. (W) BLACK

*Those who do not wish credit may take Economics 295, 296 for $25.00 per semester.*

## BUSINESS ADMINISTRATION

109. THE ECONOMIC GEOGRAPHY OF LATIN AMERICA.—This course involves comprehensive study of the resources and people of Mexico, the West Indies, and Central and South America. Special emphasis is placed upon the possibilities and limitations of increases in trade between the United States and the leading Latin-American countries. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E)

114. ECONOMIC GEOGRAPHY OF AFRICA.—A continental study of the natural environmental factors of Africa and the basic economic patterns of adjustments and adaptations on regional or national bases. Prerequisite: Economics 115 or 120. 3 s.h. (E) TUTHILL

115. FUNDAMENTALS OF GEOGRAPHY.—A study of geographic influences consisting of location, maps and their interpretation, climate, topography, soils, minerals, bodies of water, plants, animals, and the works of man. This course is required of all students in the Elementary School Teaching program, and is also recommended for those intending to specialize in foreign trade or the diplomatic service. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E) LANDON

120. ECONOMIC GEOGRAPHY OF THE PACIFIC.—An analysis of the physical influences, natural resources and economic activities of the Orient. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E) TUTHILL

138. BUSINESS STATISTICS.—A survey of the principal statistical methods and their application to economics and business administration. The course deals with collection of statistical data, construction of statistical tables and charts, and a brief study of the fundamental statistical concepts and techniques. Offered both semesters. 3 s.h. (W) HANNA AND WALLACE

Open to juniors and to sophomores in the second semester. Not open to seniors except with permission of the Director of Undergraduate Studies.

143. CORPORATION FINANCE.—Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57, 58. Offered both semesters. 3 s.h. (W) JOERG AND ETTIN

144. INVESTMENTS.—A study of the investment policies of individuals and

institutions; the securities markets; sources of investment information and data; the analysis and interpretation of financial statements. Prerequisites: Economics 57, 58 and 143. 3 s.h. (w) JOERG AND ETTIN

181. BUSINESS LAW.—The fundamental principles of law as applied to routine business transactions. The topics presented are: contracts, agency, and negotiable instruments. 3 s.h. (w) GALIFIANAKIS

182. BUSINESS LAW.—A continuation of 181. The topics presented are: partnerships, corporations, sales, personal and real property, mortgages, suretyship, bankruptcy and trade regulation. 3 s.h. (w) GALIFIANAKIS

184. COMMERCIAL LAW FOR ACCOUNTANTS.—A review and summation of commercial law principles as they apply to accounting theory and practice. Emphasis will be placed upon the commercial law sections of the Certified Public Accountant examinations. Students are admitted to the course by permission of the instructor. *For seniors.* 3 s.h. (w) BLACK

185. BUSINESS ADMINISTRATIVE ORGANIZATION.—An analysis of human behavior in administrative organizations followed by a critical examination of alternative theories of administration and organization as relevant to the business firm. 3 s.h. (w) PETHIA

188. PERSONNEL MANAGEMENT.—A study of the fundamental principles and problems of labor management and of collective bargaining under modern industrial conditions and under existing labor legislation. 3 s.h. (w) PETHIA

190. THE USE OF QUANTITATIVE METHODS IN BUSINESS.—Use of analytical tools including linear programming and other methods of operations research in the solution of managerial problems. 3 s.h. (w) NAYLOR

249. PRODUCT MARKETS.—Consumer behavior in price theory, the demand for final products. Relates the firm's demand to the type of market structure, and examines the firm's attempts to predict demand, its attempts to influence demand, and its price policies. 3 s.h. (w) FOLSOM

291. BUSINESS POLICY.—An integrating course where, through analysis of a series of case problems from the top management viewpoint, the student is given practice in arriving at effective courses of action to solve business problems. To complete this course satisfactorily the student will be required to draw upon the institutional knowledge and techniques acquired in the other courses in the department. Prerequisites: Business Administration requirements through the junior year. 3 s.h. (w) JOERG

## DEPARTMENTAL MAJORS

Specialization in one of three major areas in the Department of Economics and Business Administration is possible in the Junior and Senior years. In the Freshman and Sophomore years all majors in the Department take the same required prerequisite courses.

A. *Prerequisites required of all majors in the Department:*

1. Mathematics 17 or 21.
2. Economics 1, 2 or 51-52.
3. Economics 57, 58.

B. *Number of hours needed in each major area:* 24 hours in addition to Economics 51-52 and Economics 57, 58.

1. Economics
   Required courses: Economics 138, 143, 149, 153, 154, and 249.
   Elective courses: 6 hours in courses numbered 200 and above in Economics (not Accounting or Business Administration).
2. Accounting*
   Required courses: Economics 138, 143, 149, 171, 172, 273, 275, and 277.
3. Business Administration*
   Required courses: Economics 138, 143, 149, 153, 154, 185 or 190, 249, and 291.

(* These courses should be taken in the sequence indicated on page 43 of this *Bulletin*.)

C. *Related Work:*

1. Number of hours needed: 18 hours.
2. Departments in which related work is usually taken: Mathematics, psychology, and the social sciences. In special cases courses taken in other departments may be counted as related work with the approval of the department and the dean.

The Department offers work leading to graduation with distinction. See the section on Honors.

## EDUCATION

PROFESSOR CARTWRIGHT, CHAIRMAN; PROFESSOR STUMPF, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BOLMEIER, GITHENS, HOPKINS, AND HURLBURT; ASSOCIATE PROFESSORS COLVER, GEHMAN, JOHNSON, PETTY, RUDISILL, SHUMAN, AND WEITZ; ASSISTANT PROFESSORS BALLANTYNE, MARTIN, AND SUBLETT; INSTRUCTOR NORRIS

Courses in the Department of Education are designed for two groups of students: (1) students who have definitely chosen teaching as their life work or others with teaching experience, and (2) students who desire to study the school as a unique social institution.

Students who expect to teach in the public schools should plan their courses in accordance with the general regulations set forth under Teaching. Students who intend to teach in elementary schools should advise with Professors Petty, Rudisill, Sublett, or Stumpf; those intending to teach in secondary schools should advise with Professors Cartwright, Githens, Hurlburt, Shuman, or Stumpf. Students should confer with these advisers prior to registration each semester.

Students who do not expect to teach but desire merely an understanding of the school as part of a liberal education are advised to elect such courses as 54, 100, 104 for their introductory work in the Department and then to elect further work in accordance with their special interests.

5. DEVELOPMENTAL READING.—A course consisting of study and practice for the improvement of the reading and study skills. Work is provided in such areas as vocabulary, speed of comprehension, critical interpretation, organization of ideas, and versatility of method in reading for different purposes. 3 s.h. (W)
MISS RUDISILL

54. HISTORY OF AMERICAN EDUCATION.—A study of American education from colonial times to the present. The development of schools, their organization, administration, curriculum, and methods as seen in relation to the social forces that have produced our particular type of civilization. 3 s.h. (E) JOHNSON

68. MENTAL HYGIENE.—Development and application of psychological principles of adjustment to personal behavior. Study of factors in the development of personal adjustment as influenced by human relations in the home, school, and community. Not open to students who have had Psychology 115. 3 s.h. (E)
GEHMAN

100. SOCIAL FOUNDATIONS OF AMERICAN EDUCATION.—A study of the basic features, assumptions, viewpoints, and issues of education in contemporary America. Required of all who intend to practice teach and of all majors in Education. This course should be taken in the junior year. *Either semester.* 3 s.h. (E)
JOHNSON, MARTIN, STUMPF, AND SUBLETT

101. ELEMENTARY EDUCATION: PRINCIPLES.—The nature, subject matter, and organization for instruction of elementary education in the primary and grammar grades. Required in the elementary-education major. *Either semester.* 2 s.h. (E)
PETTY, SUBLETT

102. ELEMENTARY EDUCATION: PRACTICE.—Methods and problems of instruction in elementary education and their applications and solutions in the classroom. Required in the elementary-education major. Prerequisite: 2.10 average over-all and in the elementary-education major. *Either semester.* 6 s.h. (E)
PETTY, SUBLETT

105. ELEMENTARY EDUCATION: READING.—The process, methods, and materials basic to the teaching of reading in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) MISS RUDISILL

106. ELEMENTARY EDUCATION: LANGUAGE ARTS.—The processes, methods, and materials basic to the teaching of the language arts in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) PETTY, MISS RUDISILL

107. ELEMENTARY EDUCATION: ARITHMETIC.—The processes, methods, and materials basic to the teaching of arithmetic in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) PETTY

108. ELEMENTARY EDUCATION: SCIENCE.—The principles, methods, and materials basic to the teaching of the sciences in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) GITHENS

114. HISTORY OF EDUCATION IN EUROPEAN CULTURE.—A study of the evolution of the educational theory and practice from Greek civilization through 19th-century Europe. Emphasis will be placed upon the educational ideas of outstanding thinkers from Plato to Spencer. 3 s.h. (E) JOHNSON

118. EDUCATIONAL PSYCHOLOGY.—A study of the psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 3 s.h. (E) BALLANTYNE, GEHMAN, MCHUGH

123. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL.—The arts of writing, reading, speaking, and listening in relation to the elementary school curriculum. Required of all students majoring in Elementary Education. Either semester. 3 s.h. PETTY

142. CHILDREN'S LITERATURE.—Students enrolled will be allowed to specialize in literature of either the primary or the grammar grades. 3 s.h. (E) (Not offered in 1964-65.) MISS RUDISILL

151. PUBLIC SCHOOL MUSIC EDUCATION.—Required in the elementary-education major. See Music Education 151 for description.

152. PUBLIC SCHOOL MUSIC LITERATURE.—Required in the elementary-education major. See Music Education 152 for description.

153. VOCAL MUSIC IN THE PUBLIC SCHOOL.—See Music Education 153 for description.

154. INSTRUMENTAL MUSIC IN THE PUBLIC SCHOOL.—See Music Education 154 for description.

161. INTEGRATED ART IN THE PUBLIC SCHOOL.—Work in materials and methods applied in two-dimensional art. Required in the elementary-education major. *Either semester.* 2 s.h. (E) STARS

162. PLASTIC ART IN THE PUBLIC SCHOOL.—Work in basic three dimensional art, giving an understanding of different sculptural media with special emphasis on ceramics. The course is designed for students in elementary and secondary art education, and will provide credit toward the North Carolina Elementary and Secondary Teaching Certificates. 3 s.h. (E) STARS

201. TEACHING AND SUPERVISION OF ARITHMETIC.—Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and graduation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. 3 s.h. (E) PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, an analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. Prerequisite: six semester hours in education. 3 s.h. (E) BOLMEIER, HURLBURT, AND STUMPF

204. THE SCHOOL AS AN INSTITUTION.—Consideration is given to the

place of the school in the American social order, and its adaptation to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunities. 3 s.h. (E) BOLMEIER, EDWARDS

210. INTRODUCTION TO EDUCATIONAL RESEARCH.—The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an understanding of the essential characteristics of good research work. The course is designed to be liberalizing as well as technical. 3 s.h. (E) STUMPF

215. SECONDARY EDUCATION: PRINCIPLES.—Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Prerequisite: 2.0 average over-all and in teaching field or fields. Must be accompanied by Education 216. *Either semester.* 3 s.h. (E) GITHENS, HURLBURT, SHUMAN

216. SECONDARY EDUCATION: INTERNSHIP.—Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215. Prerequisite: 2.0 average over-all and in the major or teaching field. *Either semester.* 6 s.h. (E) CARTWRIGHT, GITHENS, HURLBURT, SHUMAN

NOTE: Education 215, 216, 118, and one other course, depending on the student's field, constitute a semester's work during the senior year.

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 s.h. (E) GEHMAN, WEITZ

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials and methods in the teaching of history and the social studies. 3 s.h. (E) CARTWRIGHT

226. TEACHING READING IN THE ELEMENTARY SCHOOL.—A study of the nature of the reading process and of principles, methods and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. Practice is provided with elementary-school children suffering reading retardation, in testing, diagnosis, and daily remedial teaching. 3 s.h (E) MISS RUDISILL

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 s.h. (E) CARTWRIGHT

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 s.h. (E) HURLBURT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 s.h. (E) BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems, and guiding students' reading. 3 s.h. (E) CARTWRIGHT

236. TEACHING READING IN THE SECONDARY SCHOOLS.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 s.h. (E) MISS RUDISILL

237. LITERATURE FOR ADOLESCENTS.—The course offers a critical survey

of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 s.h. SHUMAN

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 s.h. (E) BOWMAN, SHUMAN

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 s.h. (W) COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (W) COLVER

234. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (E) GEHMAN

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 s.h. (E) REYNOLDS

253. SCHOOL LAW.—The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 s.h. (E) BOLMEIER

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education with opportunity for individual research. Prerequisite: 12 semester hours in the Department, including a course in educational psychology. 3 s.h. (E) COLVER, WEITZ

266. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 s.h. (E) GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 s.h. (E) GITHENS

290. ADMINISTRATION OF SCHOOL PROPERTY.—Planning and management of the school plant and its equipment to meet instructional and community needs for immediate and long-range purposes. This course is intended for teachers and principals as well as for superintendents. Areas to be treated include site selection; trends in design, lighting, ventilation and heating; custodial service and maintenance; and financing. 3 s.h. (E) STUMPF

## DEPARTMENTAL MAJOR

*Major Requirements:* Number of hours needed: 24 hours in the Department, including 6 hours in senior graduate courses.

*Related Work:* Sufficient work in subjects to be taught to meet certification requirements in the state in which student intends to teach.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

### MATERIALS AND METHODS COURSES

Certain courses concerned with materials and methods in teaching the various subjects in the public school curriculum are listed in the proper subject matter department. These courses are intended to give credit on teaching certificates and are recommended by the Department of Education for such credit.

### MAJORS IN ELEMENTARY EDUCATION AND SCIENCE EDUCATION

Students desiring to teach in elementary schools or in science in secondary schools should read the descriptions of these programs of study listed under the proper headings elsewhere in this *Bulletin*.

## ENGLISH

PROFESSOR TURNER, CHAIRMAN; ASSOCIATE PROFESSOR FERGUSON, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR BEVINGTON, ACTING DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR PATTON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BLACKBURN, BOWMAN, BOYCE, DUFFEY, GOHDES, KNIGHT, LIEVSAY, LUMIANSKY, NYGARD, SANDERS, STEVENSON, AND WARD; ASSOCIATE PROFESSORS BEVINGTON, BUDD, HARWELL, HENINGER, REARDON, SMITH, WETHERBY, AND WILLIAMS; ASSISTANT PROFESSORS ANDERSON, CLOGAN, JORDAN, MICHALAK, POTEAT, PRICE, RANDALL, REIMAN, RIDDEL, SCHWERMAN, AND WILLIAMS; INSTRUCTORS GERBER, JONES, KRUEGER, MOORE, ROBINSON, AND VAN KLUYVE; MRS. HALLORAN; MESSRS. BABIN, BELFLOWER, CATE, CHAPPELL, CONE, COOK, DUNN, GRAVES, HALE, HASKIN, KAUVAR, KELLY, KUIST, LA VIA, LUDINGTON, MARRS, MASCITELLI, MCELROY, PRIDGEON, SPARLING, SUTTON, TUTT, VAN, AND WHISNANT

1-2. FRESHMAN COMPOSITION.—Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the Twentieth Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. (E & W) STAFF

53. ADVANCED GRAMMAR AND WRITING.—Emphasis is placed first on the student's mastering the fundamental principles of English grammar and the other essentials of correct writing. 3 s.h. (E) JORDAN

65-66. IMAGINATIVE WRITING.—A foundation course in imaginative writing, both prose and verse. Primarily for sophomores, but in special cases open to students from other classes. The consent of the instructor is required. 6 s.h. (E) SANDERS

93. TECHNICAL COMMUNICATION.—Emphasis will be placed on the writing of business letters, technical reports, and articles for submission to technical journals. Approximately one-third of the course will provide training in the oral presentation of various materials. Prerequisite: English 1 and 2. 3 s.h. (W) HARWELL AND STAFF

100. ENGLISH FOR FOREIGN STUDENTS.—Designed to assist the student to whom English is a second language to perfect his speaking and understanding of the language. Drills in writing, speaking, listening and the American idiom. Open to all students and their wives, and to any persons and spouses with an official connection with the University. Those who do not pay full-time student fees may register for a fee of $5.00. No credit. (W) WETHERBY

101. ADVANCED EXPOSITORY WRITING.—Designed for students interested in expository writing, this is a course in advanced composition. Primarily for

juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) FERGUSON

103-104. NARRATIVE WRITING.—Class discussion of students' manuscripts, supplemented by a critical evaluation of selected short stories and a novel and by individual conferences with the instructor. Open to sophomores, juniors, and seniors. Students desiring admission to the course should present a piece of writing to the instructor as early as possible in the spring semester. Prerequisite for English 104: English 103. 6 s.h. (E) BLACKBURN

## SPEECH AND DRAMA

51. ESSENTIALS OF PUBLIC SPEAKING.—A basic course in public speaking, designed to give the student the poise and confidence necessary to think and speak freely before an audience. Particular attention is paid to the gathering and organization of speech materials and to oral presentation. Not open ordinarily to juniors and seniors. 3 s.h. (W) MICHALAK, REARDON, AND MISS SCHWERMAN

118. PERSUASIVE SPEAKING.—The psychological and sociological techniques used in gaining acceptance of ideas through speech. Study is made of the factors influencing human behavior; audience analysis and motivation; choice, arrangement, and adaptation of material. Extensive practice in persuasive speaking. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (W) WETHERBY

119. HISTORY OF THE THEATER.—The origin and development of drama, acting, and stagecraft from ancient Greece to the modern European and American theater. Production problems of representative plays of the various periods will be discussed. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (W) MICHALAK

121. STAGECRAFT.—An introductory course on the technical aspects of play production: scenery, lighting, properties, make-up, and costuming. Laboratory work will be coordinated with the various productions of the Duke Players. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) MICHALAK

122. PLAY PRODUCTION.—An introduction to the methods of producing a play; theater organization, play selection, casting, and rehearsal. Lectures and laboratory. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) MICHALAK

139. THE SPEAKING VOICE.—A study of the mechanisms of speech. Emphasis is placed on providing the skills necessary for the improvement of voice, pronunciation, and diction. Methods of correcting minor functional speech disorders will also be studied. 3 s.h. (W) MISS SCHWERMAN AND WETHERBY

150. ORAL INTERPRETATION OF LITERATURE.—A study of poetry and certain types of prose, with practice in the technique by which they may be communicated to an audience. 3 s.h. (W) MISS SCHWERMAN

151. ESSENTIALS OF PUBLIC SPEAKING.—A basic course in public speaking for juniors and seniors dealing with the same matters as 51. (Not open for credit to students who have taken 51.) 3 s.h. (E & W)
MICHALAK, REARDON, AND MISS SCHWERMAN

152. ARGUMENTATION.—The principles of argumentation and debating. The techniques of analysis, investigation, evidence, reasoning, brief making, and refutation. Participation in class discussions and debates. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (W) WETHERBY

171, 172. BROADCASTING.—A study of the background of radio and television broadcasting. The first semester covers the development of broadcasting as an industry and as a literary form. The second semester studies the legal and social aspects, and the various program forms. 6 s.h. (W) WETHERBY

## ENGLISH AND AMERICAN LITERATURE AND LANGUAGE

55, 56. REPRESENTATIVE BRITISH WRITERS.—The following works are studied in the first semester: Chaucer's Prologue to *The Canterbury Tales* and at

least two tales, Shakespeare's *I Henry IV, Hamlet* or *King Lear,* and one other play, John Donne's poetry (selections), Milton's *Paradise Lost* (selections) and some of the shorter poems; in the second semester: Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 6 s.h. (E & W) STAFF

57, 58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works. The first semester will include Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; the second will include James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. 6 s.h. (E & W) STAFF

111, 112. EIGHTEENTH-CENTURY LITERATURE.—The writers emphasized in the first semester are Pope, Swift, Defoe, Addison, Steele, and Fielding; in the second semester, Johnson, Gray, Boswell, Goldsmith, Sheridan, the later novelists, and Blake. 6 s.h. (E) BOYCE, FERGUSON, AND WARD

117. MILTON.—Milton's poetry and prose, together with their relation to the period and to other great works of literature. 3 s.h. (E) LIEVSAY

123, 124. SHAKESPEARE.—In the first semester twelve plays, before 1600; in the second semester about ten plays, after 1600. 6 s.h. (E & W) BOWMAN, RANDALL, WARD, AND WILLIAMS

125, 126. ENGLISH LITERATURE, 1789-1832.—The course begins with selections from the poetry of the forerunners of Romanticism. The chief emphasis in the first semester is on the work of the older Romantics: Wordsworth, Coleridge, Lamb, and Hazlitt. In the second semester the chief emphasis is on the work of the younger Romantics: Byron, Shelley, Keats, and DeQuincey. 6 s.h. (W) PATTON AND REIMAN

127. THE ENGLISH NOVEL FROM THE BEGINNINGS TO 1800.—Some of the writers studied are Nashe, Deloney, Lyly, Sidney, Bunyan, Behn, Defoe, Richardson, Fielding, Smollett, and Sterne. (Not open for credit to students who have taken 157.) 3 s.h. (E) RANDALL

128. THE ENGLISH NOVEL IN THE NINETEENTH CENTURY.—Some of the writers studied are Scott, Austen, Dickens, Thackeray, Trollop, the Brontës, George Eliot, Meredith, Butler, and Hardy. (Not open for credit to students who have taken 157.) 3 s.h. (E) FERGUSON

129. THE ENGLISH NOVEL IN THE TWENTIETH CENTURY.—Some of the writers studied are Conrad, Lawrence, Forster, Joyce, Woolf, Huxley, Cary, Amis, and Golding. (Not open for credit to students who have taken 158.) 3 s.h. (E) SMITH

131, 132. ENGLISH LITERATURE, 1832-1900.—A study of the chief writers of poetry and prose from Carlyle to Yeats. The major writers studied in the first semester are Carlyle, Tennyson, Browning, Macaulay, Mill, and Newman; in the second semester, Arnold, Ruskin, the Rossettis, Morris, Swinburne, Pater, and Yeats. Collateral reading from novels of the period. 6 s.h. (E) BEVINGTON, SANDERS, AND STEVENSON

133, 134. TWENTIETH-CENTURY POETRY.—A study of twentieth-century poetry and criticism of poetry in England and America. Problems in critical analysis and interpretation. First semester: the emphasis is on sources in nineteenth-century Symbolism and on the poetry of Hopkins, Yeats, Eliot, Pound, and Stevens. Second semester: the emphasis is on the poets and the poetic theories of the last thirty years. 6 s.h. (E) MRS. BEVINGTON

137, 138. AMERICAN LITERATURE.—A survey from colonial times to the present. Selections and complete novels by Hawthorne and Melville in the first semester; Twain, Henry James, Howells, and others in the second. (Not open for credit to students who have taken a matching semester of 57, 58.) 6 s.h. (E & W) ANDERSON, BUDD, RIDDEL, AND WILLIAMS

141. CHAUCER.—*The Canterbury Tales* and the minor poems, with attention to their literary and social background. 3 s.h. (W) VAN KLUYVE

142. ENGLISH LITERATURE OF THE MIDDLE AGES.—A study of the principal forms and examples of English prose, poetry, and drama of the Anglo-Saxon and Middle English periods (excluding Chaucer), read in translation. 3 s.h.

143, 144. ENGLISH LITERATURE: ELIZABETHAN AND SEVENTEENTH CENTURY.—A study of the poetry, prose, and drama of the period. First semester: the emphasis in poetry is on Wyatt, Sidney, Spenser, Raleigh, Shakespeare; in prose, on Sidney and Florio's Montaigne; in drama, on Marlowe. Second semester: the chief emphasis is on the metaphysical poets—Donne through Vaughan. Prose: Bacon, Burton, Donne, Browne. Drama: Jonson, Webster, Ford. 6 s.h. (E) BLACKBURN

147. THE LITERARY EXPRESSION OF SCIENTIFIC THOUGHT.—Readings which delineate man's changing concept of nature, with emphasis on both the scientific thought and the literary merit of each text. Representative works of Hesiod, Plato, Aristotle, Lucretius, Descartes, Thomas Browne, Bertrand Russell, and others. Primarily for engineering students and majors in science. 3 s.h. (W) HENINGER

148. SATIRE.—An exploration of the nature and art of literary satire, based on examples, mostly English and American, of various forms and kinds; character-sketch, dialogue of the dead, fable, verse-narrative, eulogy, drama, novel, etc. Prerequisite: English 55, 56. 3 s.h. (E) BOYCE

150. ORAL INTERPRETATION OF LITERATURE.—See under "Speech and Drama."

153, 154. READINGS IN EUROPEAN LITERATURE.—Significant works are read in translation and related to similar works in English literature. The first semester includes selected writings of Homer, the Greek dramatists, Plato, Virgil, and Ovid. The second semester comprises works by Dante, More, Cervantes, Molière, Voltaire, Goethe, Dostoevski, Ibsen, and Kafka. 6 s.h. (W) HENINGER, KRUEGER, AND RANDALL

155. MODERN EUROPEAN DRAMA.—Continental and Irish plays from Ibsen to Brecht are read in relation to the modern drama of ideas and to the free theater movement. 3 s.h. (E) REARDON

156. MODERN ENGLISH AND AMERICAN DRAMA.—Plays from Pinero to Arthur Miller are read and discussed in relation to European origins and to the contemporary scene. 3 s.h. (E) REARDON

161. DEVELOPMENT OF THE ENGLISH LANGUAGE.—An elementary historical study of the English language: patterns of change and growth, with some attention to methods of philological inquiry and the relations of philology to literary studies. 3 s.h. (E) (Not offered in 1964-65.)

162. MODERN ENGLISH GRAMMAR.—A descriptive study of written and spoken American English of the present time, with attention to standards of usage and pronunciation and the relations of grammar to composition. 3 s.h. (E) CLOGAN

165, 166. AMERICAN FICTION.—A survey of the novel and the short story. The first semester covers the nineteenth century, from Washington Irving to Stephen Crane; the second covers the twentieth century through ten representative books. 6 s.h. (W) BUDD

167, 168. THE EUROPEAN EPIC TRADITION.—The development of the Epic tradition seen through detailed analysis of the major texts and major themes: Homer, Vergil, *Beowulf*, Dante, Cervantes, Milton, Tolstoy, Joyce. 6 s.h. (W) KNIGHT

181. CONFERENCE ON DRAMA.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

182. CONFERENCE ON POETRY.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

183. CONFERENCE ON FICTION.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

184. CONFERENCE ON PROSE NON-FICTION OR A SPECIAL TOPIC.—

Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Department. 6 s.h.

197-198. SENIOR SEMINAR IN ENGLISH.—A course designed to offer guidance in the analysis and interpretation of English and American literature to students of superior ability. Comparative studies will be encouraged, and considerable reading will be required in critical and aesthetic theory. Emphasis will be placed upon the final essay. Admission by invitation of the Department. 6 s.h. (E & W) BEVINGTON, BLACKBURN, AND PATTON

FOR SENIORS AND GRADUATES

203. CHAUCER.—The minor poems, *Troilus,* and *The Canterbury Tales.* 3 s.h. (W) NYGARD

207, 208. HISTORY OF THE ENGLISH LANGUAGE.—A survey of the language from Old to Present English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 6 s.h. (W) LUMIANSKY AND NYGARD

209. PRESENT-DAY ENGLISH.—A description of present-day American English, with special attention given to the phonemic, morphemic, and syntactical structure of the language; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage; and the practical application of language study to composition. 3 s.h. (W) NYGARD

213. INTRODUCTION TO FOLKLORE.—A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 s.h. (W) NYGARD

215, 216. ELIZABETHAN DRAMA.—Study of one or two major dramatists (Jonson or Beaumont and Fletcher) and extensive reading in other writers (Heywood, Ford, Massinger, Marlowe, Middleton) with emphasis on the nature and qualities of their work in relation to its historical background. 6 s.h. (W) LIEVSAY

217. MILTON.—Milton's poetry and prose, with emphasis on the major poems. 3 s.h. (W) LIEVSAY

218. SPENSER.—The reading of Spenser's works, with chief attention to *The Faerie Queene.* 3 s.h. (W) HENINGER

219, 220. THE EIGHTEENTH CENTURY.—Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson, Boswell, Collins, Goldsmith, the novelists and other writers. 6 s.h. (W) BOYCE AND FERGUSON

221, 222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—The Romantic poets and prose writers from Scott to the early Carlyle, with special attention to Wordsworth, Coleridge, and Keats. 6 s.h. (W) BEVINGTON, SANDERS, AND STEVENSON

223, 224. ENGLISH LITERATURE OF THE LATER NINETEENTH CENTURY.—The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson, and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 s.h. (W) BEVINGTON, SANDERS, AND STEVENSON

227. LITERARY CRITICISM.—Readings from the major critics, Plato to the present, with emphasis on formative ideas and historical continuity. 3 s.h. (W) LIEVSAY

229, 230. AMERICAN LITERATURE, 1800-1865.—The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 s.h. (W) BUDD AND TURNER

233, 234. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors of the period. The first semester's assignments will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local

Colorists; the second semester's, Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 s.h. (w) GOHDES

235, 236. AMERICAN LITERATURE SINCE 1920.—The first semester will include Sherwood Anderson, Mencken, Lewis, Lardner, Gertrude Stein, Pound, Eliot, Cummings, Hemingway, Faulkner, and Fitzgerald; the second semester, Dos Passos, Farrell, Steinbeck, Wolfe, MacLeish, Stephen Vincent Benet, Richard Wright, and more recent writers. 6 s.h. (w) DUFFEY

237. ENGLISH DRAMA, 1642-1800.—The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 s.h. (w) WARD

239. SHAKESPEARE.—The plays and poems. 3 s.h. (w) WILLIAMS

244. LITERARY BIOGRAPHY.—Selected works from Plutarch to Strachey with discussion of the historical development of biography, the various methods it has used, and the various theories which have been held about it. 3 s.h. (w) SANDERS

251, 252. ENGLISH LITERATURE IN THE SEVENTEENTH CENTURY.—Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 s.h. (w) WARD

261, 262. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 s.h. (w) SMITH

264. MAJOR DEVELOPMENTS IN CONTEMPORARY AMERICAN POETRY.—The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Hart Crane, the "Fugitives," and a selection from the poets of the present generation. 3 s.h. (w) (Not offered in 1964-65.)

266. RECENT CRITICAL THOUGHT.—Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 s.h. DUFFEY

269, 270. SOUTHERN LITERATURE.—The principal authors and the chief literary developments from the beginnings to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 s.h. (w) TURNER

274. AMERICAN HUMOR.—The development of the native tradition in the Down-East humorists and the humorists of the Old Southwest. Extensive reading in Mark Twain and his contemporaries, and some attention to the continuation of the tradition after Mark Twain. 3 s.h. (w) TURNER

277, 278. ENGLISH LITERATURE OF THE SIXTEENTH CENTURY.—First semester devoted to development of prose forms and styles from Caxton to Hooker and Bacon; second semester to representative non-dramatic poetry, exclusive of Spenser. 6 s.h. (w)

## DEPARTMENTAL MAJOR

*Prerequisite:* English 55-56.

*Major Requirements:* Twenty-four semester hours above the sophomore level in writing, speech, drama, literature, and language; at least eighteen hours must be in English and American literature meeting the following requirements of distribution:

1. Six hours at the junior-senior level (generally to be taken in the junior year) in one of five designated period courses (143-144, 111-112, 125-126, 131-132, 137-138).
2. Three hours in one of the major authors: Chaucer, Shakespeare, or Milton (141, 203, 123, 124, 239, 117, 217).

3. Six hours (to be taken in the senior year) in senior-graduate courses, numbered at the 200 level. These courses are to be chosen so that surveys of particular periods do not heavily duplicate in subject matter the courses taken in (1) above. Conference courses numbered 181 to 184 may be substituted for parts or all of this requirement.
4. The remaining hours must meet the following distribution requirements:
   (a) Three hours of English literature before 1800, unless the requirement is met in (1) or (3) above.
   (b) Three hours of English literature after 1800, unless the requirement is met in (1) or (3) above.
   (c) Three hours of American literature, unless the requirement is met in (1) or (3) above.

*Related Work:* Eighteen semester hours, which may include appropriate courses in history, aesthetics, art, music, foreign languages and literature, literature in translation, philosophy, religion, linguistics, and the teaching of English. Related work must be taken in at least two departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin.*

## FORESTRY

Students without a Bachelor's degree who are preparing for work in forestry as a profession should take the courses outlined under the Academic-Forestry Combination in the section on Requirements for Degrees. However, with the consent of the instructor in charge, certain forestry courses may be elected by students in other curricular provided they have had adequate preparation (see *Bulletin of the School of Forestry*).

Members of the sophomore, junior, and senior classes, whether or not registered in the Academic-Forestry Combination, may elect the following course:

52. PRINCIPLES OF FORESTRY.—Introduction to forestry in the United States; growth of trees and forests; social and economic problems in developing America's primary renewable natural resource; contribution of forests to the national economy. 2 s.h. (w) MR. WHITE

## GEOLOGY

PROFESSOR BERRY, CHAIRMAN; ASSOCIATE PROFESSOR HERON, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR DU BAR AND ASSISTANT PROFESSOR FURBISH

All students who wish to take a B.S. degree in Geology must take an approved summer field course. This normally is taken during the summer of the junior year.

51. GENERAL GEOLOGY.—This course is designed to give a general view of the surface features of the earth, their origin, structure and materials. Illustrative materials are studied in the laboratory. Excursions are made to neighboring points where the principles of the science are studied in the field. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) HERON AND STAFF

52. GENERAL GEOLOGY.—This course is designed to give some knowledge of the chief events of the earth's history. Excursions will be made to suitable neighboring localities. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 51. 4 s.h. (E) HERON AND DU BAR

57. GEOMORPHOLOGY.—A detailed study of the process at work on the land surface and the topographic forms produced by them under different climatic conditions. This course includes practice in the interpretation of topographic maps. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) BERRY

103. FUNDAMENTALS OF MINERALOGY.—Principles of crystallography, crystal chemistry, crystal physics and mineral identification. Excursions will be made to neighboring mineral localities. Three one-hour lectures or recitations

and one three-hour laboratory. Prerequisite: Chemistry 1, 2 or 2 only (may be taken concurrently). 4 s.h. (E) FURBISH

106. IGNEOUS AND METAMORPHIC ROCKS.—Silicate mineralogy, theory of origin and classification of igneous and metamorphic rocks and rock identification. Two one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 3 s.h. (E) FURBISH

108. SEDIMENTARY ROCKS.—Authigenic minerals, theory of origin and classification of sedimentary rocks and rock identification. One one-hour lecture or recitation and one three-hour laboratory. Prerequisite: Geology 51. 2 s.h. (E) HERON

143. PRINCIPLES OF STRATIGRAPHY.—Theory of correlation, sedimentation and stratigraphic units. Three one-hour lectures or recitation. Prerequisite: Geology 52. 3 s.h. (E) HERON

151. ECONOMIC GEOLOGY.—Study of world distribution, geologic occurrence and uses of important mineral deposits. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 4 s.h. (E) BERRY

152. INTRODUCTORY PALEONTOLOGY.—Systematic study of invertebrate paleontology, dealing mainly with generic characters of the fossil invertebrates and their use in identifying and correlating geologic formations. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisites: Geology 51, 52. 4 s.h. (E) BERRY

164. INTRODUCTION TO GEOLOGIC FIELD METHODS.—Principles and techniques used in geologic mapping and field studies including applicable methods of surveying and the use of aerial photographs. Field excursions will be made when possible. Two hours of lectures and three hours of laboratory each week. Prerequisites: Geology 51 and 52. 3 s.h. (E) STAFF

166. STRUCTURE.—Structural features of the earth's crust. Three one-hour lectures or recitations. Prerequisites: Geology 106, 143. 3 s.h. (E) STAFF

175, 176. MAJORS SEMINAR.—Review of current literature in selected fields of geology. Required of all majors; 175 in the spring of the Junior year; 176 in the spring of the Senior year. One hour per week. 2 s.h. (E) STAFF

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Director of Undergraduate Studies. (See page 36).

### DEPARTMENTAL MAJOR

*Prerequisites:* Chemistry 1, 2, Geology 51, and 52.

*Major Requirements:* A.B. degree, a minimum of 24 hours of geology above the elementary courses (51, 52). B.S. degree, a minimum of 24 hours of geology above the elementary courses (51, 52) plus a summer field course.

*Related Work:* 1. Number of hours needed for A.B., 12 s.h.; for B.S., 18 s.h. 2. Required courses, Mathematics 21, 22. 3. Departments in which related work is usually taken, chemistry, mathematics, physics, zoology, and engineering.

## GERMANIC LANGUAGES AND LITERATURE

PROFESSOR SALINGER, CHAIRMAN; ASSOCIATE PROFESSOR SEYMOUR, DIRECTOR OF UNDERGRADUATE STUDIES AND SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS MAXWELL, PHELPS, AND WILLSON; ASSISTANT PROFESSOR DEINERT; INSTRUCTORS ALT, DAY, AND PITTERMAN

1-2. ELEMENTARY GERMAN.—Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. 8 s.h. (E & W) SEYMOUR AND STAFF

63-64. INTERMEDIATE GERMAN.—Prerequisite: German 1-2 or equivalent. 6 s.h. (E & W) PHELPS AND STAFF

German 63-64 is prerequisite for 91, 92 and all 100 group courses.

91, 92. INTRODUCTION TO GERMAN LITERATURE.—A third-year course,

completing the language requirement. Reading from representative German authors. 4 s.h. DEINERT, PHELPS, SALINGER, SEYMOUR, AND WILLSON

107, 108. SCIENTIFIC GERMAN.—The German language as used in the various contemporary sciences. 4 s.h. MAXWELL

109, 110. GERMAN PROSE FICTION.—Origin and development of the German novel and short story with special emphasis on the nineteenth century. 4 s.h. PHELPS, SALINGER, AND SEYMOUR

115, 116. GERMAN DRAMA OF THE NINETEENTH CENTURY.—A study of leading dramatists from Kleist to Hauptmann. 4 s.h. SEYMOUR

117, 118. GERMAN CONVERSATION.—A course in writing and speaking German, restricted to German majors and other students by permission of the Department. 6 s.h. ALT AND PITTERMANN

119, 120. SURVEY OF GERMAN LITERATURE.—German literature and its cultural background. First semester: From the beginnings to the romantic period. Second semester: From romanticism to the present. Lectures, reports and readings. 6 s.h. DEINERT, PHELPS, SALINGER, AND WILLSON

125, 126. CONTEMPORARY GERMAN LITERATURE.—A study of representative works of the twentieth century. Kafka will be read first semester; Thomas Mann's selected works will be read second semester. 4 s.h. MAXWELL

131, 132. INTRODUCTION TO GOETHE.—The reading of his early novels and epics and works pertaining to his life. 4 s.h. MAXWELL

133, 134. THE GERMAN LYRIC.—A survey of the development of German lyric poetry, principally from Klopstock to Rilke (with some attention to mediaeval and early modern poets), seen as poetic reflection of German thought. 4 s.h. SALINGER

191, 192. INDEPENDENT STUDY.—Open only to qualified students by permission of the Department. See p. 36. DEINERT, PHELPS, AND SALINGER

201, 202. GOETHE.—A study of his life and works in the light of his lasting significance to world literature. 6 s.h. SALINGER

203, 204. EIGHTEENTH CENTURY.—Eighteenth-century German literature in its relation to contemporary European philosophy. 6 s.h. PHELPS

205, 206. MIDDLE HIGH GERMAN.—The language and literature of Germany's first classical period. 6 s.h. SEYMOUR

207, 208. GERMAN ROMANTICISM.—The course covers the entire field of German romanticism from 1800. 6 s.h. WILLSON

209, 210. KLEIST, GRILLPARZER, and HEBBEL.—The development of the drama in Germany and Austria between Schiller and Naturalism. 6 s.h. SALINGER AND WILLSON

211, 212. HEINRICH HEINE AND HIS TIME.—Heine's life and thought, and the contemporary European culture. 6 s.h. SALINGER

213. NINETEENTH-CENTURY LITERATURE.—From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm and Fontane. 3 s.h. DEINERT

214. THE TWENTIETH CENTURY.—From Naturalism to the present, with emphasis on Hauptmann, Hofmannsthal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht and Benn. 3 s.h. DEINERT

215. SEVENTEENTH-CENTURY LITERATURE.—A study of the leading writers of the Baroque, seen against the background of their time. 3 s.h. DEINERT

216. HISTORY OF THE GERMAN LANGUAGE.—The development of the phonology, morphology and syntax of German from earliest beginnings to the present. 3 s.h. SEYMOUR

218. THE TEACHING OF GERMAN.—Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks

and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 s.h. PHELPS

### DEPARTMENTAL MAJOR

1. *Prerequisites:* German 1-2 and 63-64, or equivalent.

2. *Major Requirements:* Twenty-four semester hours in the German Department. Twelve of these must be selected from the 200 courses. The remaining twelve may be selected from any courses in the 100 group. German 107, 108 does not count toward the major. German 117, 118, and 119, 120 (as well as Linguistics 101) are highly recommended to any student majoring in the Department.

3. *Related Work:* Eighteen semester hours, chosen from the humanities with the approval of the Germanic Languages Department.

## HEALTH AND PHYSICAL EDUCATION

TRINITY COLLEGE AND THE COLLEGE OF ENGINEERING

MR. CAMERON, DIRECTOR; PROFESSOR FRIEDRICH, DIRECTOR OF UNDERGRADUATE STUDIES AND SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS BLY, COX, FALCONE, HARRISON, AND PERSONS; ASSISTANT PROFESSORS BUEHLER, CHAMBERS, SKINNER; MESSRS. BUBAS, HAGLER, HARVEY, LUTZ, AND WATERS

### REQUIRED PHYSICAL EDUCATION FOR MEN

A student must complete four semesters of physical education in order to fulfill graduation requirements.

All students are given a medical and physical examination before registration. Students who have physical handicaps must register in Corrective Physical Education. Students assigned to these classes will take work suited to their particular needs and capacities.

Students without defects will register in Physical Education 1 and 2 in their freshman year. The activities are selected from the following: apparatus, combative games (fundamentals of basketball, speedball, soccer, volleyball), swimming, and tumbling. Swimming is required each semester of the freshman year.

After a student has completed Physical Education 1 and 2, he may complete his physical education requirement by electing and satisfactorily completing two courses from the following individual and team sports: 51. Apparatus-Tumbling; 52. Badminton; 53. Basketball-Handball; 56. Swimming, advanced; 57. Tennis-Volleyball; 58. Golf. A fee of $10.00 for the semester, payable at the Treasurer's Office, is charged for course 58, Golf.

### ELECTIVES IN PHYSICAL EDUCATION

The courses listed below are arranged to meet the increasing demand for teachers who are qualified to coach and teach Physical Education. They are open for credit only to students in the High School Teaching Program or to majors in Education. These students may elect 18 semester hours from courses in this group. Six semester hours may be elected from the courses listed under Special Methods in Physical Education, 9 semester hours from the courses listed under Theory and Practice in Physical Education, and 3 semester hours from Health Education. The courses should be selected with the advice of the Director of Undergraduate Studies in order to meet the needs of the individual.

### SPECIAL METHODS IN PHYSICAL EDUCATION

163. ATHLETIC COACHING IN SECONDARY SCHOOLS.—Theory and practice in the fundamentals of coaching baseball and track. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w)
CHAMBERS AND PARKER

164. ATHLETIC COACHING IN SECONDARY SCHOOLS.—Theory and practice in the fundamentals of coaching football and basketball. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w)
FALCONE AND WATERS

### THEORY AND PRACTICE IN PHYSICAL EDUCATION

65. HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION.—A study of the objectives and scientific principles upon which physical education is based. The history of physical education is studied in order to show the changes in objectives, principles, and methods and as an aid in the interpretation of trends. Open to sophomores, juniors, and seniors. 3 s.h. (w) FRIEDRICH

172. RECREATIONAL LEADERSHIP.—Theories and philosophies of play and recreation with application to community, school and family situations.

182. THE ADMINISTRATION OF ATHLETICS IN SECONDARY SCHOOLS.—A case study appraisal of health and physical education problems experienced in the organization and administration of health and physical education. 3 s.h. HARRISON

190. PROTECTIVE PRACTICES IN PHYSICAL EDUCATION.—A study of safety measures, including training and first aid. Open to juniors and seniors. 3 s.h. (w) CHAMBERS

### HEALTH EDUCATION

132. SCHOOL HEALTH PROBLEMS.—A course designed (a) to familiarize the teacher with school health problems such as physical screening, communicable disease prevention and control, healthful school environment; (b) to present methods and materials for health teaching in elementary and secondary schools. 3 s.h. (w) FRIEDRICH

## WOMAN'S COLLEGE

PROFESSOR GROUT, CHAIRMAN; PROFESSOR LEWIS, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR EDDY, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSOR BOOKHOUT; ASSOCIATE PROFESSORS HOLTON AND UHRHANE; ASSISTANT PROFESSORS LLOYD, SPANGLER, WOODYARD, AND WRAY; INSTRUCTOR RAYNOR

A student must complete four semester hours of physical education in order to fulfill graduation requirements. Ordinarily work must be completed by the end of the sophomore year. Classes meet three times a week or the equivalent thereof.

Each semester is divided into halves. In general, indoor activities are taught during the two winter half-semesters and outdoor activities in the fall and spring.

Every student must take one course (half-semester) in dance and one in swimming if she is unable to pass the swimming test. The remaining work necessary to complete the requirement may be elected from the activities listed in this section.

All students are given a physical and medical examination upon entering and at any other time when deemed necessary. Classes in adapted physical education and light sports are arranged for those who should not take the more active work.

### HEALTH AND PHYSICAL EDUCATION

### SPECIAL FRESHMAN PHYSICAL EDUCATION

At the beginning of the year, after a series of tests has been given, each freshman is registered for the course she most needs, as determined by the test scores. Courses in sports fundamentals, fundamentals of rhythm, beginning swimming, and posture and movement are offered for those who need to improve their skills in these areas. Students whose test scores are satisfactory will enroll in classes with the sophomores.

After the first half-semester all freshmen and sophomores enroll in classes together.

### PHYSICAL EDUCATION ACTIVITIES

Individual and dual sports: archery, badminton, bowling, diving, fencing, golf, life saving, light sports, riding, stunts, tumbling, and apparatus, swimming, tennis, first aid, instructors' life saving, and water safety.

Team sports: basketball, hockey, softball, volley ball, "rec" ball.

Dance: dance, folk dance, modern dance, square dance, tap dance.

Developmental Activities: posture and movement, posture, fundamental rhythms, sports fundamentals, and conditioning exercises.

The courses listed in this section are open for credit as follows: P.E. 91, 101, 117, 119, 181-182, 185, Health Education 101-102 open only to students preparing to teach physical education, with the exception of 91 which is open for credit to students in the Elementary Teaching Program. Physical Education 105-106, 113, 114, and Health Education 131, 134, 140, and 170, are open to all undergraduate students, both men and women.

91. FIRST AID AND SAFETY IN PHYSICAL EDUCATION.—A study of measures which must be taken to insure maximum safety in physical education programs; principles and practices in the care and prevention of athletic injuries. 1 s.h. (E) MISS LLOYD

101. HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION.—A survey of the relationship between physical education and social, political, and religious ideals of different nations and periods. Principles upon which physical education is based. A study of the physical, emotional, and social development of children at different ages with implications for physical education. Analysis of successful teaching. 3 s.h. (E) MISS GROUT

102. THE TEACHING OF PHYSICAL EDUCATION IN ELEMENTARY SCHOOLS.—A study of methods and materials for teaching physical education to children. Discussion of principles of physical education and practice in teaching elementary school activities. Required of students in the elementary school teaching program. 2 s.h. (E) MISS LEWIS

105-106. METHODS AND MATERIALS IN RECREATION.—A course intended to familiarize students with recreation activities and methods of organizing groups in these activities. Recommended for students interested in camping, scouting, YWCA work, and religious education. Laboratory work includes practical leadership experience with a recreational club or group in a city organization. Fields covered are: Social Activities, Music Activities, Folk and Square Dancing, Games and Sports, Arts and Crafts, Drama Activities. Open to juniors and seniors without prerequisite. Students who have had 102 may take 106 without 105. 6 s.h. (E) MISS HOLTON

113. MAMMALIAN ANATOMY.—A study of all organ systems with special emphasis on osteology, arthrology and myology. The cat is used as laboratory animal, but constant application is made to man. Not open to students who have had Zoology 53. Prerequisite: Zoology 1 and 2. 4 s.h. (E) MRS. BOOKHOUT

114. KINESIOLOGY.—A study of muscle function. Analysis of fundamental movements with emphasis on the development of normal posture and efficient body movement. Required of students taking the major in physical education. Prerequisites: Zoology 1 and 2, and P.E. 113 or Zoology 53. 3 s.h. (E) MRS. BOOKHOUT

117. PHYSICAL FITNESS AND INDIVIDUAL PHYSICAL EDUCATION.—An analysis of exercises designed to improve physical fitness of groups and to meet individual needs for which specific exercises are indicated. Theory of teaching individual and group gymnastics. 2 s.h. (E) MRS. BOOKHOUT

119. ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Curriculum building in physical education. The administration of class and intramural programs. Administrative problems such as budget, equipment, facilities, interschool athletics, legal aspects, and public relations. 2 s.h. (E) MISS GROUT

120. EVALUATION AND MEASUREMENT IN PHYSICAL EDUCATION.—History of evaluation and measurement in physical education. Elementary statistics and application of statistical procedure in testing. Familiarity with athletic achievement tests for elementary and secondary schools, and with testing of sport techniques, rhythm, and general qualities of motor ability, motor capacity, and motor educability. 2 s.h. MRS. BOOKHOUT

181-182. METHODS AND MATERIALS IN PHYSICAL EDUCATION.—Includes basic theory and practice in teaching various types of dance, games, and

sports. Laboratory hours are arranged to provide practice on the field and in the gymnasium. 6 s.h. (E) MISS LEWIS AND STAFF

185. ADVANCED METHODS AND MATERIALS IN PHYSICAL EDUCATION.—A continuation of 181-182. Required of senior majors in physical education. 3 s.h. (E) MISS LEWIS AND STAFF

## HEALTH EDUCATION

101-102. HEALTH EDUCATION FUNDAMENTALS, METHODS, AND MATERIALS.—Designed specifically for and open only to physical education majors. Basic studies in personal and community health; administration; curriculum and program planning; health services and health counseling; selection, purchase, and care of equipment; library sources; methods and materials for effective health teaching; evaluation techniques and procedures. 6 s.h. (E) MISS UHRHANE

131. HEALTH PROBLEMS IN THE TWENTIETH CENTURY.—Examination of such topics as: mental health, use and abuse of alcohol and drugs; radiation hazards; atmospheric pollution; population explosion, mobility and migration; basic health and fitness; consumer evaluation and judgment in regard to health services, products and information. Open to sophomores. 3 s.h. (E) MISS UHRHANE

134. SCHOOL HEALTH.—Organization and administration of the school health program; basic health problems in schools; methods and materials for teaching health education. Primarily designed for students preparing to teach in elementary and secondary schools and for physical education majors. Open to juniors and seniors only. *Either semester.* 2 s.h. (E) MISS UHRHANE

140. GEREOLOGY AND HEALTH.—Designed to help the college age person understand and appreciate the health problems of aging. Topics to be considered will include: emotional health implications in the changing role of the aged in our society; housing plans, nursing homes and medical care; health problems related to the degenerative diseases, accident hazards; nutrition; and health implications of retirement and leisure time activities. Open to sophomores. 3 s.h. (E) MISS UHRHANE

170. SPECIAL HEALTH PROBLEMS.—This course emphasizes economic, cultural and physical interrelationships operative in the creation and solution of health problems in: housing and city planning, water and waste control, food production and distribution, world health; and the effects on well-being of: killing and crippling diseases, handicapping conditions, medical care, philanthropic giving. Open to juniors and seniors only. 3 s.h. (E) MISS UHRHANE

### REQUIREMENTS FOR TEACHING PHYSICAL EDUCATION AND HEALTH IN PUBLIC SCHOOLS

The following requirements have been set up for students in the Teaching Program who wish to qualify as full-time teachers of Physical Education and Health. The requirements meet the standards of the North Carolina Department of Public Instruction for certification in Physical Education and Health and of many of the other states represented in the student body. Students preparing to teach in any state are advised to consult the Department of Education about specific requirements.

*Prerequisites:* Physical Education 91 and 101. Zoology 1-2.

*Major Requirements:* 24 s.h. including Physical Education 114, 117, 119, 120, 181-182, 185, and Health Education 101-102.

*Related Work:* Sufficient work in subjects required for certification for teaching Physical Education and Health. Of these, 8 hours must be in anatomy and physiology (P.E. 113, Mammalian Anatomy, and Zoology 151, Principles of Physiology). For the remaining hours work done in the Department of Education leading to teacher certification is acceptable. Courses in health education, chemistry, zoology, sociology, psychology, art, music, and physical education are recommended.

## HINDI-URDU

181, 182. INTENSIVE ELEMENTARY HINDUSTANI.—Four hours of classroom work, two hours of language drill. Concentration on the acquisition of

conversational ability in Hindustani, with a grammar and vocabulary basic to both Hindi and Urdu. Introduction to the Devanagari script, and the reading of graded texts. 8 s.h. SWAN

183, 184. INTENSIVE INTERMEDIATE HINDUSTANI.—Four hours of classroom work, two hours of language drill. Advanced conversation in Hindustani. Reading and Composition. Introduction to the Nastaliq script. (Prerequisite: Elementary Hindustani.) 8 s.h. SWAN

HINDI 185, 186. ADVANCED HINDI READING AND COMPOSITION.—An introduction to scholarly and literary Hindi prose, and extensive practice in composition. Prerequisite: Hindustani 183, 184, or equivalent. 6 s.h. SWAN

These courses are offered as an enrichment program for students interested in the South Asian subcontinent and may be taken as general electives by advanced undergraduate students. No major work is offered in Hindi-Urdu.

## HISTORY

PROFESSOR WATSON, CHAIRMAN; PROFESSOR COLTON, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR ROPP, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS ALDEN, CRANE, CURTISS, FERGUSON, HAMILTON, HOLLEY, LANNING, MANCHESTER, NELSON, PARKER, AND WOODY; VISITING PROFESSORS BARNES, CLARK AND RAYCHAUDHURI; ASSOCIATE PROFESSORS ACOMB, DURDEN, HOLLYDAY, W. SCOTT, VAN AKEN, AND YOUNG; ASSISTANT PROFESSORS DAVIS, GILLIN, LERNER, AND A. SCOTT; INSTRUCTORS CELL, GINTER, WALL, WALLACE, AND WALTON; MR. HOHNER AND MR. ROLLER

The undergraduate courses in history are designed to afford (1) an introduction to the study of history by a consideration of the history of the modern world; (2) a more intensive study of general American history; (3) opportunities for more advanced study of phases of American, English, European, Hispanic-American, Russian, and Asian history.

Course 1-2 or 51-52 or the equivalent is a prerequisite for all other courses; courses 91 and 92 are prerequisite for all 100 and 200 courses in United States history. However, seniors with written permission from the instructor may take advanced American history courses without having had 91 and 92. Sophomores who took only one semester of course 1-2 in the freshman year may take courses 91, 92, 95, 96 or 99 concurrently with the second semester, provided they made a grade of B or above on the semester taken. Sophomores must obtain permission of the instructor in order to be admitted to courses numbered above 100; students who are not fully qualified sophomores will not be admitted to these courses. Courses for seniors and graduates are limited to twenty-five students; juniors may not elect them without special permission from the Department and the Executive Committee of the Graduate Faculty.

1, 2. MODERN HISTORY.—This course is an introduction to the study of modern history with special reference to the issues in the modern world. Topics selected for emphasis are: the contest between liberty and authority in the modern state; changing economic organization and theory—capitalism and the challenges to it; the problems of peace and war among the states; the changing faiths men live and die by. Beginning about 1500 with the rise of the European dynastic states, the story is pursued in the first semester to approximately 1848, and in the second through the two great world wars. The central theme in both semesters is the expansion of the influence of Western Europe throughout the world, with some attention to the rise of the United States as a world power. 6 s.h. (E & W)

Sophomores and juniors are not admitted to this course.

FERGUSON AND ROPP; MISS ACOMB, HOLLYDAY, AND YOUNG; GILLIN AND LERNER; CELL, GINTER, WALL, WALLACE, AND WALTON

51, 52. MODERN HISTORY.—An introductory course for sophomores, juniors, and seniors dealing with the topics indicated in the description of course 1-2. 6 s.h. (E & W) PARKER; MISS ACOMB, HOLLYDAY, SCOTT, AND YOUNG; CELL AND GINTER

51X, 52X. MODERN HISTORY.—A special section for seniors who have had

no other history at Duke. The topics covered will be essentially the same as those indicated in the description of History 1-2. 6 s.h. (W) ROPP

91. THE DEVELOPMENT OF AMERICAN DEMOCRACY TO 1865.—This course is a study of the trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social behavior, and conflicting ideals are considered in relation to this main theme. 3 s.h. (E & W)

HOLLEY; DURDEN; DAVIS AND MRS. A. SCOTT; HOHNER, ROLLER, AND WALL

92. THE DEVELOPMENT OF AMERICAN DEMOCRACY, 1865 TO THE PRESENT.—A continuation of History 91 with emphasis upon the emergence of contemporary problems. 3 s.h. (E & W)

HOLLEY; DURDEN; DAVIS AND MRS. A. SCOTT; HOHNER, ROLLER, AND WALL

Courses 91 and 92 are intended both to serve as continuation courses in the study of history and to afford the student an opportunity to gain the understanding of the past of the United States essential for intelligent citizenship. These courses are prerequisite for all 100 and 200 courses in United States history, but this prerequisite may be waived for seniors by written permission of the instructor.

95, 96. ANCIENT AND MEDIEVAL HISTORY.—An introductory study of the history of mankind from preliterate man through the development of the characteristic institutions of Western Europe. The first semester considers the prehistoric tribes, the early cultures of Mesopotamia and Egypt, the religious contribution of the Hebrews, and classical Greece and Rome. The second semester deals with Europe in the Middle Ages, from Constantine to Columbus, with emphasis upon institutional and cultural development. 6 s.h. (E) YOUNG

99. NAVAL HISTORY AND ELEMENTARY STRATEGY.—After a review of earlier periods, attention is given to the rise of sea-power and its importance in more recent times and to naval actions, especially in the two World Wars. This course is not open to students who have had N.S. 102. 3 s.h. (W) ROPP

105, 106. POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND.—The origins and evolution of the principal institutions of the English government, related to their setting in a changing society. 6 s.h. (W) HAMILTON

107, 108. SOCIAL AND CULTURAL HISTORY OF ENGLAND.— A study of English history from the fourteenth century to the present time in an effort to arrive at a synthesis of social and political events and thus provide a background for the study of English literature. Emphasis is placed on the ages of Chaucer, Shakespeare, and Milton; the eighteenth and early nineteenth centuries; the reign of Victoria and the twentieth century. 6 s.h. (E) FERGUSON

*Sophomores who made an average grade of B or above on course 1-2 may be admitted to this course.*

111, 112. AMERICA IN THE COLONIAL AND EARLY MODERN ERA.—Lectures upon the history of America from the discovery to the beginning of the Civil War. They will be primarily concerned with things political, institutional, and social, with occasional discussions of intellectual and cultural advance. 6 s.h. ALDEN

113, 114. AMERICA IN THE TWENTIETH CENTURY.—A historical survey of political, economic, and social problems of twentieth-century United States. Emphasis is placed on reform movements from the Muckrakers through the Fair Deal, the emergence of the United States as a world power, and conflicting ideas and ideologies. 6 s.h. (W) WATSON

121, 122. FOREIGN RELATIONS OF THE UNITED STATES, 1775 TO THE PRESENT (first semester to 1898).—With emphasis on social and economic currents as well as on diplomacy. 6 s.h. (W) DAVIS

123. CITY AND FRONTIER IN AMERICAN HISTORY 1607-1880.—The westward movement and the progress of urbanization with special attention to the social and political consequences. 3 s.h. (E) MRS. A. SCOTT

124. CITY AND FRONTIER IN AMERICAN HISTORY 1880 TO THE PRESENT.—A continuation of History 123 covering the later movement to the West and the urbanization of the post Civil War period. 3 s.h. (E) MRS. A. SCOTT

127. HISTORY OF LATIN AMERICA THROUGH THE FORMATION OF THE NATIONAL GOVERNMENTS.—3 s.h. (w) LANNING AND VAN AKEN

128. INTER-AMERICAN AFFAIRS.—This course treats the relations of the Latin-American states with each other and with the United States with the design of explaining the current significance of Latin America. Chief emphasis is placed upon social problems and movements common to all the republics and upon the role of the United States in Latin-American affairs, including such topics as American intervention; contributions of the United States to Latin-American life in such matters as public health; Pan-Americanism; Pan-Hispanism; foreign penetration and ideologies; the cultural and commercial aspects of the Good Neighbor Policy; Latin-American states in the World Wars. 3 s.h. (w) LANNING

131, 132. THE DEVELOPMENT OF THE MAJOR SOUTH AMERICAN POWERS.—Political, social, and economic history of Argentina, Brazil, and Chile since independence. First semester to 1890; second semester to the present day. 6 s.h. VAN AKEN

135, 136. EUROPE IN THE TWENTIETH CENTURY.—Political, economic, and intellectual developments in Europe since 1900. First semester to 1933; second semester to the present day. 6 s.h. (w) COLTON

137, 138. FOREIGN RELATIONS OF THE EUROPEAN POWERS.—European diplomacy and Europe's position in the world since 1870, with an introductory survey of diplomatic institutions since the Renaissance. 6 s.h. (w) W. SCOTT

139, 140. NINETEENTH-CENTURY EUROPE.—With special attention to Germany and Austria-Hungary, this course will emphasize the development of European nationalism and the clash of freedom and authority. 6 s.h. (w) HOLLYDAY

141, 142. CHINA AND JAPAN IN MODERN TIMES.—A history of their response to the West between 1750 and the present, with some attention to their cultural background. 6 s.h. GILLIN

147. THE HISTORY OF INDIA TO 1757: A SURVEY.—The history of the Indian sub-continent; classical Hindu civilization; the coming of Islam; the Mughal Empire; European penetration and rivalries; the establishment of British supremacy. 3 s.h. (w) CRANE

148. THE HISTORY OF INDIA, 1757 TO THE PRESENT: A SURVEY.—The East India Company; British impact; the Indian Mutiny; the nature and effects of Crown Rule; Indian nationalism; Muslim nationalism; the Gandhian Era; the transfer of power; partition and independence; the contemporary scene. 3 s.h. (w) CRANE

153, 154. THE HISTORY OF THE SOUTH.—A study, beginning in the Colonial period, of the development of the Southern part of the United States with particular attention to its distinctive characteristics and institutions and to their influence in shaping Southern attitudes toward major questions of national policy. 6 s.h. (w) WOODY

157, 158. THE RISE OF MODERN SCIENCE.—A historical survey of the development of scientific ideas. First semester, Copernicus through the Age of Newton; second semester, the science of the nineteenth and twentieth centuries. 6 s.h. WALLACE

161, 162. RUSSIA FROM IVAN THE TERRIBLE TO PRESENT TIMES.—Topics treated include the rise of the Russian state and its relations with Poland and Turkey; the agrarian problem and the rise of industry; the Russian Revolution; the political, agricultural and industrial policies of the Soviet Union; the role of the U.S.S.R. in World War II; and its postwar policies. 6 s.h. (w) CURTISS AND LERNER

163, 164. REFORM AND POLITICS IN NINETEENTH CENTURY AMERICA.—First semester: the coming of the Civil War with emphasis on the reform movements of the Jackson era, and anti-slavery crusade and national politics to 1865. Second semester: reform and politics from the Reconstruction era to the Farmers' Revolt of the 1890's. 6 s.h. (w) DURDEN

FOR SENIORS AND GRADUATES

Students may receive credit for either semester of a hyphenated course at the 200-level without taking the other semester if they obtain written permission from the instructor and either the Director of Undergraduate or the Director of Graduate Studies.

201-202. THE HISTORY OF RUSSIA, 1801-1917.—The development of the Russian Empire in its political, social, and economic aspects, and the growth of forces leading to its downfall. 6 s.h. CURTISS

203-204. THE UNITED STATES, 1850-1900.—The rise of sectionalism, secession, war-time problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform, the Spanish-American War. 6 s.h. (w) WOODY

205-206. THE UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administrations. (Not open to students who have had History 113.) 6 s.h. (w) WATSON

208. ECONOMIC HISTORY OF MODERN INDIA.—A historical study of the development of the Indian economy in the 19th and 20th centuries with special emphasis on structural and institutional changes. 3 s.h. RAYCHAUDHURI

212. RECENT INTERPRETATIONS OF UNITED STATES HISTORY.—A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. 3 s.h. (w) WATSON

*Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.*

213-214. THE OLD SOUTH.—Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufacturing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 s.h. (w) WOODY

215-216. THE DIPLOMATIC HISTORY OF THE UNITED STATES.—A study of the history of American diplomacy, with particular emphasis on those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 s.h. (w) DAVIS

221-222. THE AGE OF THE RENAISSANCE.—The decline of characteristic features of medieval civilization and the rise of modern European institutions with particular attention to intellectual movements from Dante to Erasmus. 6 s.h. (E) NELSON

223-224. THE OLD REGIME AND THE FRENCH REVOLUTION, 1661-1815.—A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 s.h. MISS ACOMB

225-226. THE AGE OF THE REFORMATION.—A survey of European civilization from 1500 through the Peace of Westphalia. 6 s.h. (E). NELSON

227, 228. EUROPE IN THE NINETEENTH CENTURY.—A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 s.h. (w) PARKER

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 3 s.h. PARKER

*Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.*

231-232. THE HISPANIC COLONIES AND REPUBLICS IN AMERICA.—6 s.h. (w) LANNING

233-234. THE INSTITUTIONAL, CULTURAL, AND SOCIAL HISTORY OF HISPANIC AMERICA.—The first semester deals with the culture, society, and institutions of the Spanish colonies in America and the second semester with those of the Hispanic American republics. 6 s.h. (w) LANNING

235, 236. EUROPEAN EXPANSION OVERSEAS (1415-1898).—A course dealing primarily with the processes by which European institutions were carried overseas and modified in a new environment. In the first semester the emphasis is on Portuguese, Dutch, French, and English experience in the Far East and the Americas to 1763. In the second semester, attention is paid to the emergence of independent centers of European culture, as in Brazil, and to the revivals of mercantile imperialism of the new German, French, Italian and British empires of the nineteenth century. 6 s.h. (w) MANCHESTER

237-238. EUROPE IN THE MIDDLE AGES, 395-1500.—Attention is given both to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 s.h. YOUNG

241-242. NATIONALISM AND COMMUNISM IN THE FAR EAST.—The growth of nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 s.h. GILLIN

245-246. WAR IN THE MODERN WORLD.—This course is concerned with the relations between warfare and modern political, economic, and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 s.h. (w) ROPP

247. THE HISTORY OF MODERN INDIA, 1757-1857.—Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 s.h. (w) CRANE

248. THE HISTORY OF MODERN INDIA AND PAKISTAN, 1857-1947.—Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 s.h. (w) CRANE

249-250. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—The interplay of ideas and social practice through the examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 s.h. (w) HOLLEY

251-252. RECENT EUROPEAN HISTORY.—A history of political and economic developments in Western Europe since 1870. 6 s.h. (w) COLTON
*Not open to students who have had 135, 136.*

259-260. THE EMERGENCE OF THE NEW SOUTH, 1865 TO THE PRESENT.—Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 s.h. DURDEN

261-262. RUSSIA SINCE 1917.—A study of the background of the Revolution of 1917 followed by an analysis of the history and policies of the Soviet state. 6 s.h. (w)
*Not open to students who have had 161-162.* CURTISS AND LERNER

263-264. AMERICAN COLONIAL HISTORY AND THE REVOLUTION, 1607-1789.—The founding and institutional development of the English colonies; the background, progress, and results of the Revolution. 6 s.h. (w) ALDEN

267, 268. FROM MEDIEVAL TO EARLY MODERN ENGLAND.—The intellec-

tual, social, and political problems of transition to modern England, with special emphasis on the English Renaissance. 6 s.h. (w) FERGUSON

*Not open to students who have had 107.*

269. BRITISH HISTORY FROM 1714 TO 1867.—The interrelationship of the leadership of such men as Walpole, Chatham, Pitt, and Peel with war, revolution, and social institutions; the rise of the cabinet system; the Industrial Revolution; imperial changes; and reform. 3 s.h. (w) HAMILTON

270. GREAT BRITAIN AND THE COMMONWEALTH OF NATIONS, 1867 TO THE PRESENT.—A history of Great Britain at the height of her world dominance and beyond, her oceanic empire, and the evolution of that empire into a unique world-wide Commonwealth of Nations. 3 s.h. (w) HAMILTON

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the formation of the classical civilization of the Indian sub-continent from the prehistoric Indus Age to the Gupta Period (4th century A.D.). Attention will be given to the development of political, economic, social and religious movements and institutions. 3 s.h. [Listed also in the Department of Religion] SULLIVAN

297. THE BRITISH EMPIRE IN THE NINETEENTH CENTURY (FROM 1783).—3 s.h. (w)

298. THE COMMONWEALTH IN THE TWENTIETH CENTURY.—3 s.h. (w)

## INDEPENDENT STUDY

191, 192. INDEPENDENT STUDY.—Designed to permit superior students to pursue individual research and reading under the supervision of a member of the staff. Open only to juniors with a B average in History and in their over-all work. Normally such students would be candidates for graduation with distinction. Admission will be subject to approval of the individual instructor and of the Director of Undergraduate Studies of the Department of History. 6 s.h. STAFF

193, 194. INDEPENDENT STUDY.—Same as 191, 192, but for seniors. 6 or 12 s.h. STAFF

## UNDERGRADUATE SEMINARS

*Prerequisites:* History 1, 2 (or 51, 52) and History 91, 92 (except for History 195A-196A) and the consent of the instructor.

The following seminars are designed to offer opportunities for reading and historical investigation in significant problems. Juniors as well as seniors may apply for admission to these courses, and are urged to do so if they expect to be candidates for graduation with distinction in history or if they expect to practice-teach in their senior year. All seminars are open to non-majors as well as to majors.

195A-196A. THE BACKGROUND OF MODERN EUROPEAN CIVILIZATION.—Topics in intellectual-cultural history of Europe and adjacent areas from the earliest records to 1648. The work aims to develop critical appreciation and maturity of judgment through using primary sources. 6 s.h. (E) NELSON

195B-196B. SEMINAR IN TWENTIETH-CENTURY EUROPE.—6 s.h. (w)

*Students may not receive credit for this course and 251-252.* COLTON

195C-196C. PROBLEMS IN AMERICAN INTELLECTUAL HISTORY.—6 s.h. (w) HOLLEY

*Students may not receive credit for this course and 249-250.*

195D-196D. THE PROGRESSIVE ERA THROUGH THE NEW DEAL.—6 s.h. (w) WATSON

195E-196E. SEMINAR IN AMERICAN HISTORY BEFORE 1789.—6 s.h. (w) ALDEN

195F-196F. PROBLEMS IN NINETEENTH CENTURY AMERICAN REFORM AND POLITICS.—6 s.h. DURDEN

*Students may not receive credit for this course and 163-164*

195G-196G. NATIONALISM AND COMMUNISM IN THE FAR EAST.—This course will combine general reading and discussion with occasional lectures and

specialized research on the events and forces underlying developments in China, Japan, and other Far Eastern areas during the 19th and 20th centuries. 6 s.h. GILLIN

195H-196H. FROM RURAL TO URBAN SOCIETY IN THE UNITED STATES.—6 s.h. MRS. A. SCOTT

195I-196I. NATIONALISM AND FREEDOM IN NINETEENTH CENTURY EUROPE.—6 s.h. HOLLYDAY

195J-196J. THE HISTORY OF INTERNATIONAL SOCIALISM AND COMMUNISM.—International Socialist and Communist movements from Utopian Socialism to the present. 6 s.h. LERNER

197-198. SENIOR HONORS SEMINAR.—A course designed to introduce qualified students to advanced methods of historical research and writing and to the appraisal of critical historical issues. Open only to seniors, but not restricted to candidates for degree with distinction. This course, when taken by a history major, would be in addition to the 6 semester hours required in 195-196 seminars or 200-level courses of the History Department. 6 s.h. HOLLEY AND PARKER

### DEPARTMENTAL MAJOR

*Prerequisite:* The Introductory Course in History (1-2 or 51-52).

*Major Requirements:* Students desiring to take a major in history are required to elect, in addition to History 1-2 or 51-52, 24 semester hours in the Department, including six semester hours in either an undergraduate seminar (195-196) or any course in the 200 group. Students are urged to take History 91-92; in any case those wishing to take the more advanced courses in American history should elect History 91-92 in the sophomore or junior year.

*Honors:* Any student who is qualified (see the section on Honors in this *Bulletin* for general requirements) may undertake work leading to a degree with distinction in History by presenting himself to his History faculty advisor as a candidate. Normally, Honors work involves participation in one of the Undergraduate Seminars during the junior year and selection for the Senior Honors Seminar in the senior year.

### COURSES APPROVED FOR RELATED WORK IN HISTORY

Art; History of Art
Economics, but not the courses listed under business administration and accounting except those in economic geography
Education, 54, 104, 225
English and American literature, but not composition, speech, and drama (except 119)
German, Greek, Latin, Russian, and the Romance Languages: the literature courses numbered 100 or above that are not primarily conversation or composition courses
Greek, Latin, except those courses that are primarily grammar or composition
Linguistics, 101
Music; History of Music
Philosophy, except 48
Political Science
Psychology, 91, 100, 101
Religion, especially those numbered above 100
Sociology

## HONORS-MASTERS PROGRAM

For a brief description of this program see page 37 of this *Bulletin*.

COLLOQUIUM 101, 102. THE UNIVERSITY AND THE SCHOLAR.—Selected readings and informal discussions about such topics as the role of universities and teacher-scholars, the history of Duke University, the art of teaching, academic freedom, scholarly writing, and other related matters. 2 s.h.

## LINGUISTICS

The courses in Linguistics may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major is offered in Linguistics. Students interested in the study of language as a part of their undergraduate program or as a preparation for graduate work in linguistics should consult the instructors of the courses listed below.

101. INTRODUCTION TO LINGUISTICS.—Origin and nature of language, methods of descriptive linguistics with reference to historical and comparative linguistics. No specific prerequisite. Sophomore standing. 3 s.h. SEYMOUR

For a description of the following courses consult the listings under the specified department.

DEVELOPMENT OF THE ENGLISH LANGUAGE (English 161)
MODERN ENGLISH GRAMMAR (English 162) CLOGAN
OLD ENGLISH GRAMMAR AND READINGS (English 207) LUMIANSKY AND NYGARD
HISTORY OF THE ENGLISH LANGUAGE (English 208) LUMIANSKY AND NYGARD
OLD FRENCH LITERATURE (French 219) VINCENT
MIDDLE HIGH GERMAN (German 205, 206) SEYMOUR
HISTORY OF THE GERMAN LANGUAGE (German 216) SEYMOUR
PHILOSOPHY OF LANGUAGE (Philosophy 109) WELSH
ROMANCE LINGUISTICS (Romance Languages 224) HULL
CULTURAL ANTHROPOLOGY (Sociology 94) LABARRE
OLD SPANISH LANGUAGE (Spanish 257) DAVIS

## MATHEMATICS

PROFESSOR GERGEN, CHAIRMAN; PROFESSOR DRESSEL, ACTING CHAIRMAN; ASSISTANT PROFESSOR HARE, ACTING DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR HICKSON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS CARLITZ, ELLIOTT, MURRAY, ROBERTS, AND THOMAS; ASSOCIATE PROFESSORS GALLIE, REYNOLDS, SHOENFIELD, AND WARNER; ASSISTANT PROFESSORS BRYSON, BURDICK, DEAN, HARRIS, HINRICHS, KELINGOS, KITCHEN, SCOVILLE, SMITH, AND STACKELBERG; MESSRS. ADAMS, AMBROSE, BEWICK, CAIRNS, ENTWHISTLE, FARMER, GORDON, KELLY, LOCKSLEY, RATCLIFFE, SCHORR, TOKAZ, TURNER, WILD, AND WILTRAKIS

The following program of courses in Mathematics is planned for 1964-65. Fall: 11, 17, 21, 22, 41, 63, 64, 83, 111, 113, 135, 139, 141, 217, 221, 227, 233, 235, 247, 271, 283, 285, 291. Spring: 18, 21, 22, 42, 63, 64, 84, 112, 114, 131, 136, 140, 142, 218, 221, 222, 228, 234, 236, 248, 272, 286, 292.

11. ALGEBRA AND TRIGONOMETRY.—Factoring, fractions, linear equations in one or several unknowns, introduction to coordinates and graphing, exponents and radicals, numerical trigonometry. Prerequisite: two units of college preparatory mathematics. 3 s.h. (E & W) STAFF

17. INTRODUCTION TO FINITE MATHEMATICS.—A course designed to introduce students to some of the concepts in modern mathematics. Elementary logic, sets and subsets, vectors and matrices, and probability theory are studied. Some applications of these topics to the biological, social, and physical sciences are considered. Prerequisite: two and one-half units of college preparatory mathematics. 3 s.h. (W) STAFF

18. ELEMENTARY STATISTICS.—An introduction to statistics with emphasis on fundamental concepts. Topics studied include summarization of data, mean and standard deviation, normal, binomial and other distributions, sampling, statistical estimation, and testing hypotheses. Prerequisites: Mathematics 17. 3 s.h. (W) STAFF

21, 22. INTRODUCTORY CALCULUS.—Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: two and one-half units of college preparatory mathematics. Mathematics 21 is prerequisite for Mathematics 22. 6 s.h. (E & W) STAFF

41, 42. INTRODUCTORY CALCULUS.—A special course covering the topics of Mathematics 21, 22 in a more extensive and rigorous fashion, designed for students who have demonstrated marked proficiency in mathematics. Credit for this course and Mathematics 21, 22 is not allowed. Prerequisite: four units of college preparatory mathematics. 6 s.h. (W) STAFF

63, 64. INTERMEDIATE CALCULUS.—Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 22 for 63; and 63 for 64. 6 s.h. (W) STAFF

83, 84. INTERMEDIATE CALCULUS.—A continuation of Mathematics 41, 42, with coverage including the topics of Mathematics 63, 64 and related basic topics in mathematics. Credit for this course and Mathematics 63, 64 is not allowed. Prerequisite: Mathematics 42 for 83; and 83 for 84; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (W) STAFF

111. APPLIED MATHEMATICAL ANALYSIS I.—Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Mathematics 131. Prerequisite: Mathematics 64. 3 s.h. (W) STAFF

112. APPLIED MATHEMATICAL ANALYSIS II.—Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Mathematics 64. 3 s.h. (W) STAFF

113, 114. MODERN ALGEBRA.—Vector spaces, linear transformations, matrices, elementary theory of groups, rings, and fields. Prerequisite: Mathematics 63 for 113; and 113 for 114. 6 s.h. (W) HINRICHS

131. ELEMENTARY DIFFERENTIAL EQUATIONS.—Solution of differential equations of elementary types; formation and integration of equations arising in applications. Not open to students who have had Mathematics 111. Prerequisite: Mathematics 63. 3 s.h. (W) STAFF

135, 136. PROBABILITY AND STATISTICS.—Permutations and combinations, total and compound probability, Bayes' formula, Bernoulli's theorem, discrete distributions, central values, moments and mathematical expectation, law of large numbers, probabilities in continuum, continuous distributions, sampling distributions, confidence limits, tests of hypotheses, and analysis of variance. Prerequisite: Mathematics 63 for 135; and 135 for 136. 6 s.h. (W) BURDICK

139, 140. ADVANCED CALCULUS.—Multiple integrals and Jacobians, infinite series, power series, differential equations, vector analysis, line and surface integrals, Green's theorem, Stoke's theorem, improper integrals. Prerequisite: Mathematics 64 for 139; and 139 for 140. 6 s.h. (W) ELLIOTT

141, 142. JUNIOR MATHEMATICS SEMINAR.—An honors course designed to coordinate and advance the mathematical knowledge of students who have demonstrated marked proficiency in mathematics and who desire intensive and rigorous work in this subject. Student reports will be required. Prerequisite: Mathematics 84 for 141; and 141 for 142; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (W) KITCHEN

183, 184. SENIOR MATHEMATICS SEMINAR.—An honors course continuing the work in Mathematics 141, 142, designed primarily for seniors. Prerequisites: Mathematics 141 and 142 for 183; and 183 for 184. Mathematics 183 and 184 must be preceded or accompanied respectively by Mathematics 217 and 218. 6 s.h. (W) KITCHEN

FOR SENIORS AND GRADUATES

204. GEOMETRY FOR TEACHERS.—The metric and synthetic approaches to plane and solid geometry are investigated. Affine geometry and an algebraic model of Euclidean geometry are discussed. 3 s.h.

213, 214. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations. 3 s.h. DRESSEL

217, 218. ANALYSIS.—Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 s.h. (w) KELINGOS

221. DIGITAL COMPUTER.—History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 22. 3 s.h. (w) SCOVILLE

222. INTRODUCTION TO NUMERICAL ANALYSIS.—Introduction to numerical analysis, error analysis, real and complex roots of equations, finite difference methods and theory of interpolation, numerical differentiation and integration, numerical integration of ordinary and partial differential equations, simultaneous equations and matrix inversion. Prerequisite: Mathematics 64 and 221. 3 s.h. (w) GALLIE

227, 228. THEORY OF NUMBERS.—Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums of squares. Prerequisite: Mathematics 64 for 227; and 227 for 228. 6 s.h. (w) CARLITZ

229, 230. ALGEBRAIC NUMBERS.—Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: Mathematics 113 for 229; and 229 for 230. 6 s.h. (w) CARLITZ

233. STATISTICAL METHODS.—Parameter estimation and hypothesis testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 s.h. (w) BRYSON

234. SAMPLE DESIGNS.—Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 s.h. (w) BRYSON

235, 236. ABSTRACT ALGEBRA.—Groups, fields, rings, matrices, quadratic and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: Mathematics 64 for 235; and 235 for 236. 6 s.h. (w) WARNER

244. DESIGN OF EXPERIMENTS.—Methods of constructing and analyzing designs for experimental investigation, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 s.h. (w) BURDICK

247, 248. ARITHMETIC OF POLYNOMIALS.—Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 235 or consent of the instructor for 247; and 247 for 248. 6 s.h. (w) CARLITZ

253, 254. DIFFERENTIAL GEOMETRY.—Curves and surfaces in three dimensional Euclidean Space, applicability, differential parameters, Riemannian geometry of n-space. Prerequisite: Mathematics 64 for 253; and 253 for 254. 6 s.h. (w) THOMAS

271, 272. INTRODUCTORY TOPOLOGY.—Topological properties of Euclidean spaces, set-theoretic and combinatorial methods. Prerequisite: Mathematics 64 for 271; and 271 for 272. 6 s.h. (w) ROBERTS

283. PROBABILITY FOR ENGINEERS.—Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: Mathematics 64. 3 s.h. (w) BURDICK

285. APPLIED MATHEMATICAL METHODS I.—Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 s.h. (w) DRESSEL

286. APPLIED MATHEMATICAL METHODS II.—Wave equation, Fourier series, heat equation, telegraphic equations, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Mathematics 64. 3 s.h. (w) DRESSEL

287, 288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 64, or consent of instructor for 287; and 287 for 288. 6 s.h. (w) SHOENFIELD

291, 292. THEORY OF FUNCTIONS.—Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: Mathematics 64 for 291; and 291 for 292. 6 s.h. (w) DEAN

### DEPARTMENTAL MAJOR

For the A.B. degree:

*Prerequisite:* Mathematics 21, 22.

*Major and Related Work:* 42 semester hours.

*Major Requirements:* Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

*Related Work:* 18-24 semester hours of course work from the following departments: chemistry, economics and business administration, philosophy, physics. Two courses above the introductory level must be taken in at least one of these departments.

For the B.S. degree:

*Prerequisite:* Mathematics 21, 22.

*Major and Related Work:* 48 semester hours.

*Major Requirements:* Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

*Related Work:* 14-24 semester hours of course work in the natural sciences. Two courses above the introductory level must be taken in at least one of these departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

## MEDICAL SCIENCE

This course in medical science has been approved by the Faculty Council as appropriate for the Bachelor's degree.

M201. ANATOMY AS RELATED TO LOCOMOTION.—The part of the body concerned with locomotion and posture will be dissected completely, whereas the thoracic, abdominal and pelvic organs, and the deeper structures of the head will be taught by means of audio-visual aids and prosections. September to January. Prerequisites: One year each of biology, chemistry, and physics. 6 s.h.

MARKEE AND EVERETT; BECKER AND DUKE

# MUSIC

PROFESSOR BONE, CHAIRMAN; ASSOCIATE PROFESSOR WITHERS, DIRECTOR OF UNDERGRADUATE STUDIES; VISITING PROFESSOR HAMILTON; ASSOCIATE PROFESSORS BRYAN, HANKS, KLENZ, MUELLER, AND SAVILLE; ASSISTANT PROFESSOR HENDRIX; VISITING ARTISTS LESHIN, B. PEPPER, AND J. PEPPER; VISITING LECTURER TREVARTHEN; INSTRUCTORS FISHBAUGH, FRIEDBERG, AND HENRY; MMES. CUSHMAN AND MCCALL

Courses in music are offered both for the general student who wishes to acquire knowledge of music as literature and, on a more technical level, for those prepared to major in the field. The courses marked * are open to general students without prerequisite.

## THEORY AND COMPOSITION

*55-56. BASIC MUSICIANSHIP.—Principles of tonal organization—notation, key, scale, interval, triad, meter, rhythm—experienced through practical applications of solfeggio, aural analysis and performance techniques. Recommended for general students who are engaged in choral and instrumental activities and for those students who wish to develop a basic technical foundation. One lecture, two laboratory hours, throughout the year. 4 s.h. (E) BRYAN

65-66. MUSIC THEORY I. *Harmony and Theory of Music.*—Manipulation and analysis of melodic, harmonic, rhythmic, contrapuntal and formal principles of tonal organization through written exercises, ear training, sightsinging and keyboard harmony. Three lectures, two laboratory hours throughout the year. 8 s.h. (E) BRYAN, FISHBAUGH, AND TREVARTHEN

115-116. MUSIC THEORY II. *Advanced Harmony and Counterpoint.*—First semester, exercises in advanced harmonic techniques and studies in formal analysis; second semester, emphasis on contrapuntal techniques and writing in the smaller forms. Prerequisite: Music 65-66. Two lectures; two laboratory hours throughout the year. 6 s.h. (E) BRYAN, FISHBAUGH, AND TREVARTHEN

Formerly 73-74.

117, 118. MUSIC THEORY. III. *Composition and Analysis.*—The development of technical and expressive means in various media and styles through practical exercises in composition and analysis of larger forms. The completion of an original work in an instrumental or choral medium. Prerequisite: Music 115-116 or consent of the instructor. 4 s.h. (E) HAMILTON

121. CONDUCTING.—The conducting of orchestral and vocal scores. Score-reading and analysis, principles of interpretation, establishment of vocal and instrumental conductoral techniques leading to practical experience in conducting the department musical organizations in rehearsal. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) BONE

122. ORCHESTRATION.—A study of the technical characteristics and transpositions of the instruments of the modern symphony orchestra and concert band. Instrumentation of piano scores of original compositions for string, woodwind, brass ensembles, and for full symphony orchestra or concert band. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) BRYAN

## HISTORY AND LITERATURE

*1-2. INTRODUCTION TO MUSIC LITERATURE.—Rhythm, melody, harmony, form, instruments of the orchestra as principal elements of an effective listening technique. Selected works representing major composers of the Baroque, Classic, Romantic, and Contemporary periods are approached through the several performance media of song, orchestra, piano, chamber music, opera. Open only to freshmen; others, see Music 51-52 and 51X-52X. 6 s.h. (E) HENRY

*51-52. INTRODUCTION TO MUSIC LITERATURE.—The aims of this course are identical with those of Music 1-2; the content and method are adapted to the capacities of upperclassmen. Open only to upperclassmen who have not completed Music 1-2. 6 s.h. (E) STAFF

*51X-52X. INTRODUCTION TO MUSIC LITERATURE.—A special section for music majors and advanced general students. The course sequence will be essentially the same as that of Music 1-2. 6 s.h. (E) TREVARTHEN

*125. MASTERWORKS OF MUSIC LITERATURE.—An intensive study of selected masterworks which represent the principal currents in modern music history. Compositions by Bach, Mozart, Beethoven, Brahms, Debussy and Bartok will constitute a frame of reference for historical, biographical and stylistic analysis. 3 s.h. (E) HAMILTON AND MUELLER

133. ORCHESTRAL LITERATURE.—A study of orchestral suites, overtures, concerti, symphonies, and symphonic poems selected from literature of the eighteenth century to the present. Prerequisite: a one-year course in Music Theory or Literature, or concent of the instructor. 3 s.h. (E) BONE

*134. CHORAL LITERATURE.—A study of great choral works from the Renaissance to the present. The development of the mass, motet, cantata, oratorio, and passion, with attention to changing aesthetic and religious concepts as well as to formal and stylistic means. Intensive study of complete scores of composers selected from palestrina to Stravinsky; individual projects. 3 s.h. (E) SAVILLE

135. PIANO LITERATURE.—A survey of the great works for keyboard instruments, from the time of the English virginal composers to the present. Prerequisites: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) WITHERS

136. SOLO SONG LITERATURE.—A study of selected standard repertoire: early Italian and English songs, German lieder; the French, English and American art song and the standard operatic aria. Open to voice students and others by consent of the instructor. 3 s.h. (E) HANKS

137. CHAMBER MUSIC.—An analytic study of representative masterpieces of the chamber music repertoire with emphasis upon the Classic Quartet literature. Prerequisite: a one-year course in Music Theory or Literature, or consent of the instructor. 3 s.h. (E) MUELLER

139. TWENTIETH CENTURY MUSIC.—The course will trace the most influential creative stylistic developments in music of the present century. A critical survey will emphasize works by key figures Bartok, Berg, Schonberg, and Stravinsky as a means of establishing a relative standard of values for subsequent independent exploration. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 3 s.h. (E) HAMILTON

141. BEETHOVEN: AN ANALYSIS OF THE CLASSICAL SYSTEM.—Selected major works showing Beethoven's treatment of the orchestra, piano and opera. Inquiry will be made into the total concept of the great classical tradition which finds its culmination in this composer's work. Detailed structural and harmonic analysis will be stressed. Prerequisites: Music 65-66, 115-116. 3 s.h. (E) HAMILTON

147-148. HISTORY OF MUSIC.—The history of the development of music as a manifestation of Western culture from mediaeval to modern times. The rise of Christianity through the Renaissance, first semester; the Baroque to the present, second semester. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 6 s.h. (E) SAVILLE AND KLENZ

149. ORGAN LITERATURE.—A survey of the great works for organ from Bach to the present day. Interpretive analysis illustrated through performance whenever practicable. Attention will be given to problems of registration and style relating to the technical capacities of organ construction in each period studied. Emphasis on J. S. Bach, 19th century French and contemporary organ works. Open to organ students and others by consent of the instructor. 3 s.h. (W) HENDRIX

*163. MUSIC IN THE EIGHTEENTH CENTURY.—The development of important instrumental and vocal media and formal concepts through study of the music, the musicians and their environment. 3 s.h. (E) BRYAN

*164. MUSIC IN THE NINETEENTH CENTURY.—A study of the music of the nineteenth century, from Beethoven to Debussy, with attention to artistic and

literary influences, and the relations among the creative minds of the time. Individual projects. 3 s.h. (E) MRS. MUELLER

*165. OPERA LITERATURE.—A study of opera from the Florentine Camerata to the present. The development of the operatic idea, with attention to changing relationships of music and text, to opera as social commentary, as well as to formal and stylistic means. Intensive study of complete scores of composers selected from Monteverde to Bartok; individual projects. 3 s.h. (E) SAVILLE

## INDEPENDENT STUDY AND SENIOR SEMINAR

Admission to these courses will be subject to approval of the Director of Undergraduate Studies of the Department of Music and the individual instructor. The instructor as well as the course content will be established in accordance with the individual student's interests and capacities.

The Department offers work leading to graduation with distinction. See the section on Academic Honors on page 36.

191, 192. INDEPENDENT STUDY.—Designed to permit superior students to pursue independent reading and musical analysis within a prescribed area of musical literature. Open to juniors. See page 36. 6 s.h. (E) STAFF

193, 194. INDEPENDENT STUDY.—Same as 191, 192 but for seniors. See page 36. 6 s.h. (E) STAFF

195. CORRELATING INDEPENDENT STUDY.—Correlated study in the humanities, cultural epochs in European civilization or church history and liturgy is suggested. An extended paper is required. Intended primarily for senior music majors, but other qualified students may be admitted. 3 s.h. (E) KLENZ

197, 198. SENIOR SEMINAR IN MUSIC.—Offers guidance in the sources and materials of musical literature, and in the methods of stylistic analysis and criticism. A background of historical, stylistic, and theoretical knowledge is essential. Formal papers will be required. Open only to seniors, but not restricted to candidates for degree with distinction. 6 s.h. (E) STAFF

## MUSIC EDUCATION

57-58. VOCAL DICTION.—Problems of diction as specifically applied to the art of singing. Required of all Applied Voice Majors. 2 s.h. (E) HANKS

106. PIANO METHODS AND MATERIALS.—A study of the materials and methods of piano pedagogy. The appropriate choice of essential and supplementary literature. Development of technique, style, and musicianship. Supervised practice teaching. Prerequisite: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) WITHERS

151. PUBLIC SCHOOL MUSIC EDUCATION.—Development of the child through music. Child voice and song literature; rhythmic activities; learning to listen; use of elementary instruments such as the autoharp, psaltery, bells, rhythm band instruments. Both group and individual help in elementary music theory; music reading exercises; chording and improvising piano accompaniments; conducting; construction of rhythm band scores. Integration of music with other activities, such as planning music for social studies units. 3 s.h. (E) MCCALL

152. PUBLIC SCHOOL MUSIC LITERATURE.—A study and analysis of key works in the symphonic, pianistic, and vocal repertoire which are particularly applicable to the teaching of music appreciation as a cultural aspect of social studies in the public school. 3 s.h. (E) MRS. MUELLER

153. VOCAL MUSIC IN THE PUBLIC SCHOOL.—Aims, repertoire, and techniques for teaching vocal music in the junior and senior high schools. Emphasis on organizations, administration, training, and performance of school choirs and ensembles; care of the changing voice. Planning a good music curriculum. 3 s.h. (E) SAVILLE

154. INSTRUMENTAL MUSIC IN THE PUBLIC SCHOOL.—Materials and methods of teaching instrumental music in the junior and senior high schools; emphasis on teaching technics, repertoire, organization, and administration of the instrumental curriculum. 3 s.h. (E) BONE

## APPLIED MUSIC

The study of Applied Music concerns the understanding of music literature through performance. Instruction is offered in the following media: A. Piano; B. Strings; C. Woodwinds; D. Brass; E. Voice; F. Ensemble—Instrumental, Piano, Vocal coaching and performance; participation through one of the Departmental Ensembles listed at close of the Music section; G. Organ. Instruction in media A through E may be private or in classes limited to a minimum of 4 and a maximum of 7 students. Class instruction is restricted to the first 4 grades of proficiency. Class instruction shall be designated by adding the letter X to the appropriate medium and year-in-school classification. (Example: junior year, Woodwinds, class instruction is recorded 147CX.)

Students must contact the Music Department office so as to arrange an audition with the appropriate instructor *prior to registration in Applied Music courses.* The course numbers listed below refer to the student's class standing and not his musical proficiency.

47A, 48A; 97A, 98A; 147A, 148A; 197A, 198A. PIANO.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) WITHERS; FISHBAUGH

47B, 48B; 97B, 98B; 147B, 148B; 197B, 198B. VIOLIN, VIOLA, 'CELLO.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) J. PEPPER; LESHIN; B. PEPPER

47C, 48C; 97C, 98C; 147C, 148C; 197C, 198C. WOODWINDS.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HENRY

47D, 48D; 97D, 98D; 147D, 148D; 197D, 198D. BRASS.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) BRYAN

47E, 48E; 97E, 98E; 147E, 148E; 197E, 198E. VOICE.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HANKS; MRS. CUSHMAN

47F, 48F; 97F, 98F; 147F, 148F; 197F, 198F. ENSEMBLE.—For freshmen, sophomores, juniors, seniors. 1 s.h. (E) STAFF

47G, 48G; 97G, 98G; 147G, 148G; 197G, 198G. ORGAN.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HENDRIX

*Credits:* Credit for instruction in media A, B, C, D, E, and G is granted on the basis of 2 s.h. per semester for *one hour* of private instruction per week and a minimum of six hours practice weekly; or 1 s.h. per semester for *one-half hour* of private instruction, or one period of class study, and a minimum of six hours practice per week. An additional weekly class meeting for performance and criticism may be required by the instructor without additional credit.

Credit for instruction in medium F is granted on the basis of 1 s.h. per semester for one rehearsal period of instruction and a minimum of three hours practice per week

*Music majors* shall plan their Applied Music study so as to meet the following requirements of their chosen areas of concentration:

Majors in Music Theory or Music History and Literature must earn a minimum of 6 s.h. credit in Applied Music.

Majors in Applied Music must register for one hour of private instruction *per semester* and may earn a maximum of 18 s.h. credit in Applied Music.

Majors in Music Education who expect to teach music in the public schools should plan their Applied Music programs in consultation with the Director of Undergraduate Studies in Music. The credit hours in Applied Music required for certification in North Carolina may be earned through a program which includes the study of a major medium, a minor medium and participation in departmental organizations. (See p. 43 of this *Bulletin*).

*Students other than music majors may receive not more than 8 s.h. credit for work in Applied Music.* They may elect, after consultation with the Department either 1 hour (2 s.h. credit) or ½ hour (1 s.h. credit) of private instruction per semester. *No credit in Applied Music* will be allowed unless the student satis-

factorily completes at some time before graduation six semester hours in Music Theory, or Music History and Literature.

FEES: Upper class students who have been accepted as music majors at the time of registration for applied music courses are exempt from paying the applied music fees. Other students are charged for all applied music media except "F" (Ensemble).

Fees are payable to the Treasurer's office of Duke University upon notification from that office at the beginning of each semester as follows:

| | |
|---|---|
| One ½ hour private lesson per week for one semester | $45.00 |
| Two ½ hour private lessons per week or one 1-hour private lesson per week for one semester | 80.00 |
| One 1-hour class lesson per week for one semester | 20.00 |

All students registered for applied music instruction are charged for practice room facilities as follows:

| | |
|---|---|
| Medium A. Piano<br>Medium E. Voice<br>Medium G. Organ | $15.00 per semester (room with piano or organ) |
| Medium B. Strings<br>Medium C. Woodwinds<br>Medium D. Brass | $10.00 per semester (room without piano) |
| Medium F. Ensemble | No practice room fee is charged |

## DEPARTMENTAL MAJOR

*Prerequisites:* Music 51-52 and 65-66.

*Major Requirements:* A minimum of 24 s.h. beyond the prerequisite courses. Initial work in the Department includes the following required courses:

| | |
|---|---|
| Freshman Year: | Music 65-66 |
| Sophomore Year: | Music 51-52, Music 115-116 |
| Junior Year: | Music 147-148 |

During Orientation Week all prospective entering Freshman Music Majors are required to take: A. Piano proficiency exam., B. Theory proficiency exam., C. Audition in their major performance medium.

### Areas of Upperclass Specialization

Concentration in one of four major areas in Music is possible in the Junior and Senior years. While the following outlines include more than the number of hours *required* for a major in music, they are strongly recommended by the Department as a basis for effective study.

*Theory and Composition*

Required:
Music 117-118, 195 or 196; Applied Music: 6 s.h.

Additional Departmental Recommendations:
Music 122; plus Music Electives: 6 s.h.

*History and Literature*

Required:
2 Elective Courses in Music Literature; plus Music 195, 196; Applied Music: 2 s.h.

Additional Departmental Recommendations:
Music Electives: 10 s.h., including a minimum of 4 s.h. in Applied Music.

*Applied Music*—A program of study designed for those students who intend to become performers and teachers of applied music.

Required:
Applied Music: 12 s.h.

Additional Departmental Recommendations:
Applied Music: 6 s.h.
Piano or Organ:
Music 135 or 149; 106 (Piano Majors only)
Voice:
Music 136; 57-58.
Other Media:
Study sequence to be worked out in consultation with the Director of Undergraduate Studies.

*Music Education*—A program of study designed for prospective teachers of High School Instrumental or Vocal Music. Details of this program are shown on page 43 of this *Bulletin*.

The music major must participate in one of the Departmental Ensembles or Organizations during *each* semester of undergraduate study.

DEPARTMENTAL ENSEMBLES

Brass Ensemble
Chamber Orchestra
Madrigal Singers
Piano Ensemble (may be in combination with Instruments or Voice)
String Ensemble (Sonata, Trio or Quartet)
Vocal Ensemble (Opera Workshop)
Woodwind Quintet

DEPARTMENTAL ORGANIZATION

Duke University Concert Band
Duke University Symphony Orchestra

## NAVAL SCIENCE

PROFESSOR DURANT, COLONEL, U.S. MARINE CORPS, CHAIRMAN; ASSOCIATE PROFESSOR LE TOURNEAU, COMMANDER, U. S. NAVY, DIRECTOR UNDERGRADUATE STUDIES; ASSISTANT PROFESSORS: TWOMEY, MAJOR, U. S. MARINE CORPS; GOBEN, LIEUTENANT COMMANDER, U. S. NAVY; STUTZ, LIEUTENANT, U. S. NAVY; CRACKNELL, LIEUTENANT, U. S. NAVY; AND INSTRUCTOR JONES, LIEUTENANT (JG), U. S. NAVY

Standardized titles and numbers for courses are established by the Bureau of Naval Personnel for use at the 52 NROTC institutions. The first digit indicates the year of the course; the second digit (0) indicates that it is given on a semester basis; the third digit indicates the semester of the school year in which offered. Specialized courses for Marine Corps Officer candidates are indicated by the letter "M" after the number, and substitute for the basic course of the same number.

NS 101. NAVAL ORIENTATION.—History of navy regulations, naval customs and courtesies which are basic to further study of Naval Science. Introduction to carrier, air, surface, undersea, and amphibious warfare; basic types, characteristics, capabilities, and limitations of naval vessels; deck seamanship; naval formations and maneuvers. 3 s.h. (w) LE TOURNEAU, CRACKNELL, AND JONES

NS 102. NAVAL HISTORY.—Naval history relating the rise and fall of sea power to other aspects of world history as a basis for understanding the role of navies in the world today. 3 s.h. (w) LE TOURNEAU AND CRACKNELL

91. INTRODUCTORY PSYCHOLOGY.—See page 115 of this *Bulletin* for course description. This is a University course required for all NROTC midshipmen.

NS 202. NAVAL WEAPONS.—A survey of the fundamentals of naval weapons and systems including the gun-weapon delivery problem, anti-submarine warfare, missiles, nuclear weapons, and space technology and their application to the control of the seas. 3 s.h. (w) JONES

NS 301. NAVIGATION.—Magnetic and gyro compasses; principles of chart construction; dead reckoning; piloting, nautical astronomy including a study of the actual and apparent motion of the earth, celestial coordinates, times systems, the astronomical triangle, identification of stars and planets; solutions of observations for lines of position; and work in practical navigation. 3 s.h. (w) STUTZ

NS 302. NAVAL OPERATIONS.—A survey of the components of general naval operations including concepts and application of relative motion, collision prevention, communications, weather, and the command and delegated functions involved in maneuvering single ships and multiship formations. 3 s.h. (w) STUTZ

NS 401. NAVAL ENGINEERING.—Principles of steam engineering as related to naval power plants for main propulsion and auxiliary machinery; principles of the marine nuclear engineering propulsion system; principles of ship stability and damage control; a general understanding of internal combustion engines. 3 s.h. (w) GOBEN

NS 402. PRINCIPLES AND PROBLEMS OF LEADERSHIP.—A study of the principles and problems of effective leadership with emphasis on the role of the military leader. Leadership precepts of personal example, sound management practice, and moral responsibility; human relations; discipline and administration of military justice are included. 3 s.h. (w) GOBEN

NS 401M. AMPHIBIOUS WARFARE.—History and development of amphibious operations and organization; analyses of amphibious operations of World War II and of the Korean action. 3 s.h. (w) TWOMEY
For Marine Corps Candidates.

NS 402M. AMPHIBIOUS WARFARE, PART II.—Further study of selected amphibious operations; Uniform Code of Military Justice; leadership. 3 s.h. (w)
For Marine Corps Candidates.
TWOMEY

## PHILOSOPHY

PROFESSOR BAYLIS, CHAIRMAN; ASSOCIATE PROFESSOR WILSON, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR BINKLEY, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS NEGLEY, PEACH, AND WELSH; ASSOCIATE PROFESSOR CLARK; ASSISTANT PROFESSOR SPECTOR

The undergraduate program in the Department of philosophy is designed to acquaint students with the content and the structure of philosophical theory in various areas. Discussion is encouraged so that the student can engage actively in the philosophical examination of problems.

Course offerings fall into two general categories: the systematic and the historical. In a systematic treatment, the organization of a course is primarily in terms of the problems presented by the subject-matter of that course, as in logic, ethics, metaphysics, etc. In historical courses, attention is directed more to the order of development in the thought of a particular philosopher (Plato, Aristotle, Kant, etc.), or in a historical period. In all courses, reading of the works of philosophers will acquaint the students with the important and influential contributions to the definition and solution of philosophical issues.

The problems raised in philosophy in respect to the various field of the arts and sciences involve questions which are not normally given attention in those particular disciplines. In the consideration of such problems, therefore, it is expected that the student will acquire some understanding and perspective of the major areas of man's intellectual endeavor. In this sense, philosophical comprehension is an essential part of a student's learning and education.

41, 42. KNOWLEDGE, FACT, AND VALUE.—An introduction to philosophy through the study of some of its main problems. These include, in Philosophy 41, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. In Philosophy 42 these include the nature and ground of values, ultimate goals, and moral obligation. (Philosophy 42 may be taken before, or with, Philosophy 41.) 6 s.h. STAFF

48. LOGIC.—A study of the conditions of effective thinking and clear communication. Examination of the basic principles of *deductive* reasoning. Open to freshmen and sophomores only. 3 s.h. BINKLEY, CLARK, AND WELSH

93, 94. HISTORY OF PHILOSOPHY: ANCIENT AND MODERN.—An introduction to philosophy through the study of some of the major writings of the ancient Greek philosophers (93) and modern philosophers through Kant (94). 6 s.h. (E) (Open to freshmen with a *B* average.) PEACH AND WILSON

101. PHILOSOPHY OF RELIGION.—A philosophical examination of selected concepts and doctrines of religion. 3 s.h. (E) BINKLEY

103. SYMBOLIC LOGIC.—Detailed analysis of deduction and of deductive systems. Open to sophomores only by permission of instructor. 3 s.h. (E) CLARK AND WILSON

104. PHILOSOPHY OF SCIENCE.—The principal philosophical and methodological problems in contemporary science. 3 s.h. (E) SPECTOR

107. POLITICAL AND SOCIAL PHILOSOPHY.—Discussion of the fundamental principles of political and social organizations, with particular attention to democratic philosophy, corporate theory, and Marxist-Soviet philosophy. 3 s.h. (W) NEGLEY

108. SOCIAL IDEALS AND UTOPIAS.—Reading of selected Utopias; analysis of the value-structures and political principles of these ideal societies. 3 s.h. (W) NEGLEY

109. PHILOSOPHY OF LANGUAGE.—A philosophical analysis of problems arising in the study of language and symbolism. Topics include: the nature of language, sign-using behavior, theories of meaning, types of discourse (scientific, mathematical, poetic), definition, ambiguity, metaphor. 3 s.h. (E) WELSH

110. EPISTEMOLOGY.—A treatment of the problems of truth and knowledge; of *a priori* and empirical statements; and of theories of perception and probability. 3 s.h. (E) BAYLIS, BINKLEY

111. METAPHYSICS.—A consideration of a selection from the following: Hegelian essentialism and existentialist reaction; traditional treatments of the mind-body problem: dualism, phenomenalism and materialism; rival theories of causation, space and time. 3 s.h. (E) BAYLIS, BINKLEY, AND WILSON

117. HISTORY OF ETHICS.—The development of ethical thought in the West; the interaction between culture and ethical theory, with special reference to the Greek city-state, Roman law, the Renaissance, the Reformation, and the rise of modern science. Readings in the great ethical philosophers. 3 s.h. (E) WELSH

FOR SENIORS AND GRADUATES

202. PHILOSOPHY OF ART.—A study of some fundamental issues in aesthetics, with particular reference to the fields of literature, music, and painting. Problems discussed include: the nature and purposes of the arts; meaning in the arts; art and morality; the role of standards in art criticism; aesthetic judgment; interpretation and evaluation. 3 s.h. (E) WELSH

203. CONTEMPORARY ETHICAL THEORIES.—Study of the nature and justification of basic ethical concepts in the light of the chief ethical theories of twentieth century British and American philosophers. 3 s.h. BAYLIS AND BINKLEY

205. THE PHILOSOPHY OF HISTORY.—Discussion of the method, metaphysical implications, and influence of interpretations of history; Hegel, Marx, Spengler, Toynbee. 3 s.h. (W) NEGLEY

208. POLITICAL VALUES.—Analysis of the systematic justification of political principles and the political values in the administration of law. 3 s.h. (W) NEGLEY

211. PLATO.—A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 s.h. (E) BINKLEY

217. ARISTOTLE.—A study of parts of the *Organon, Physics, De Anima,* and *Metaphysics.* 3 s.h. (E) WILSON

219. KANT.—Reading and discussion of his philosophy, with some attention to historical continuity. 3 s.h. (W) NEGLEY

225. BRITISH EMPIRICISM.—A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 s.h. (E) PEACH

227. CONTINENTAL RATIONALISM.—A critical study of the writings of Descartes, Spinoza, or Leibniz, with special emphasis on problems in the theory of knowledge and metaphysics. 3 s.h. (E) PEACH

228. RECENT AND CONTEMPORARY PHILOSOPHY.—A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 s.h. (E) WELSH

229. AMERICAN PRAGMATISM.—Studies in the philosophy of Pierce, James, Dewey, and Mead. 3 s.h. (E) WELSH

233. INTRODUCTION TO THE PHILOSOPHY OF SCIENCE.—A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. SPECTOR

234. PHILOSOPHY OF SCIENCE.—Selected problems in the physical and non-physical sciences. Topics such as space, time, measurement, probability and induction, and problems in the philosophy of the behavioral and social sciences. Prerequisite: Philosophy 233. SPECTOR

235. PHILOSOPHY AND THE SCIENCES.—An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincare, and Einstein. (1964-65) SPECTOR

236. SPECIAL PROBLEMS IN THE PHILOSOPHY OF SCIENCE.—Selected topics concerning the methods of the sciences and the philosophy of science. (1964-65) Prerequisite: Previous work in the philosophy of science, or consent of the instructor. SPECTOR

The four courses above are given normally in a two year cycle.

241. LOGIC.—Fundamental problems of logic. 3 s.h. (E) CLARK AND WILSON

246. GENERAL SEMANTICS AND THEORY OF LANGUAGE.—An examination of semantical theory through Frege, Russell, Church, Tarski, Carnap, and Quine, together with a consideration of the implications of meaning theory for general philosophy. 3 s.h. (E) WILSON

250. PHILOSOPHICAL ANALYSIS.—A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and results on this movement. 3 s.h. (E) BAYLIS, CLARK, AND WILSON

252. METAPHYSICS.—A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 s.h. (E) BAYLIS, CLARK, AND WILSON

291, 292. CRITICAL PHILOSOPHY.—The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem solving. 3 s.h. each. Enrollment only by permission of the department. 291 is ordinarily prerequisite for 292. (E) THE GRADUATE STAFF

## DEPARTMENTAL MAJOR

Philosophy 48 (Logic) is recommended for all those intending to major in philosophy. Philosophy 41, 42 is ordinarly a prerequisite to major work.

*Major requirements:* 24 semester hours in philosophy of which at least eighteen must be in courses numbered above 48. The following must be included:

Philosophy 93 and 94.
Philosophy 117, or 203, or 208.
6 semester hours in Philosophy senior-graduate courses.

*Related Work:* Six hours minimum in each of two departments approved by the Philosophy adviser. Courses may not be those primarily open to freshmen.

There is no restriction in principle as to departments in which related work may be taken, and the approval of the Philosophy adviser is required only to insure some coherence in the program of major and related work as a whole.

The Department offers work leading to graduation with distinction. See the section on Honors.

## PHYSICS

PROFESSOR FAIRBANK, CHAIRMAN; ASSOCIATE PROFESSOR MEYER, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR CARPENTER, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BIEDENHARN, FOWLER, GORDY, GREULING, LEWIS, NEWSON, NIELSEN, AND SPONER; ASSOCIATE PROFESSOR ROBINSON; VISITING ASSOCIATE PROFESSOR ROBL; ASSISTANT PROFESSORS BILPUCH, EVANS, ONLEY, ROBERSON, TANGHERLINI, TILLEY, AND WALTER; VISITING ASSISTANT PROFESSOR MIYAGAWA; LECTURER BARTON; INSTRUCTOR HUNT

1-2. INTRODUCTORY PHYSICS.—This course traces historically and experimentally the development of the important principles of physics. This course is open to freshmen, sophomores and juniors and meets the general science requirement. Three lectures and one two-hour laboratory each week. 8 s.h. (w)
CARPENTER, NIELSEN, BARTON, AND ASSISTANTS

41-42. GENERAL PHYSICS.—This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Prerequisites: Mathematics 21, 22 or equivalent (Mathematics 21, 22 may be taken concurrently). 8 s.h. (w)
CARPENTER, LEWIS, FAIRBANK, GREULING, ONLEY, TANGHERLINI, EVANS, WALTER, AND ASSISTANTS

125. INTERMEDIATE PHYSICS—MECHANICS.—The course covers in a thorough manner the elements of mechanics. Three recitations per week. Prerequisites: Physics 1-2 or 41-42 or equivalent, and a course in differential and integral calculus. Mathematics 22 may be taken concurrently. 3 s.h. (w) TILLEY

126. INTERMEDIATE PHYSICS—ELECTRICITY.—The elements of electricity and magnetism. Three lectures and one three-hour laboratory per week. Prerequisites: Physics 125 or equivalent work approved by the instructor and differential and integral calculus. 4 s.h. (w) TILLEY

161, 162. MODERN PHYSICS.—Review of electromagnetic fields, relativity, quantum phenomena, atomic and molecular spectra, solids, and nuclear physics. Three lectures each week. Prerequisites: Physics 41-42, Mathematics 22. 161 is prerequisite for 162. 6 s.h. (w) ROBERSON

171. ELECTRONICS.—A.C. circuits, transients, fundamentals of vacuum tubes and electron physics, basic electronic circuits. Three lectures and one three-hour laboratory each week. Prerequisite: Physics 126 or equivalent work approved by the instructor. 4 s.h. (w) HUNT

176. INTERMEDIATE PHYSICS—THERMODYNAMICS AND KINETIC THEORY.—The elements of thermodynamics, kinetic theory and elementary statistical mechanics. Three lectures per week. Prerequisites: Physics 125 or equivalent work approved by the instructor, and differential and integral calculus. 3 s.h. (w)
MEYER

A course in general college physics, Physics 125 and 126 or equivalent validated by examination, and a course in differential and integral calculus are prerequisites to all courses numbered 200 and above.

201, 202. MECHANICS.—The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and rigid bodies; the methods of LaGrange and Hamilton; generalized mechanics. 6 s.h. TANGHERLINI

213, 214. CONTEMPORARY PHYSICS.—A course which covers the fundamental

concepts and the experimental basis of modern physics. Three lectures each week. 6 s.h. (w) WALTER

217, 218. ADVANCED PHYSICS LABORATORY.—Measurements involving the fields of mechanics, electricity, magnetism, heat, optics and modern physics. 6 s.h. (w) MEYER

219. ELECTRICITY AND MAGNETISM.—Fundamentals of electricity and magnetism. Physical optics. Electromagnetic waves. 3 s.h. (w) GREULING

220. ADVANCED ELECTRONICS.—Vacuum tubes and solid state devices, advanced circuit analysis. Three lectures and one three-hour laboratory each week. 4 s.h. (w) HUNT

221, 222. THEORETICAL PHYSICS.—Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optic, relativity thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 s.h. (w) ROBL

225, 226. ELEMENTARY INVESTIGATIONS.—The aim of this course is to provide training in the laboratory and library methods of physical research. Properly qualified students may conduct elementary investigations under the supervision of a member of the staff. 3-6 s.h. (w) THE STAFF

### DEPARTMENTAL MAJOR

A student wishing to major in physics should arrange to complete the necessary mathematics as soon as possible.

A. for the A.B. degree:

*Prerequisites:* Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22.

*Major Requirements:* At least 18 semester hours in physics including Physics 125, 126, 171 and 176 or equivalent 217 or 218.

*Related Work:* Eighteen to 24 semester hours from the following courses: Mathematics 21, 22, 63, 64 and 131, and Chemistry 1-2.

B. for the B.S. degree:

*Prerequisites:* Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22 or equivalent.

*Major Requirements:* Physics 125, 126, 171, and 176 or equivalent, 213, 214, 217, 218 and either 201 or 219.

*Related Work:* Fourteen to 24 semester hours from the following courses: Mathematics 21, 22, 63, 64 and 131, and Chemistry 1, 2 or 1 and 42.

The Department offers work leading to graduation with distinction. See the section on Honors.

## POLITICAL SCIENCE

PROFESSOR RANKIN, CHAIRMAN; ASSISTANT PROFESSOR HOWARD, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BALL, BRAIBANTI, COLE, CONNERY, HALLOWELL, AND WILSON; VISITING PROFESSOR KULSKI; ASSOCIATE PROFESSORS HALL, LEACH, PROCTOR, SIMPSON, AND SINDLER; VISITING ASSOCIATE PROFESSOR JEWELL; ASSISTANT PROFESSORS CHEEK AND KEARNEY; DRS. MORGAN AND PIPER; MESSRS. LOVINK AND PILANT

The general objective of the Department of Political Science is to acquaint students with the theory and practice of government and politics at the local, state, national and international levels. While primary attention is focused upon the American political and administrative system, emphasis is also placed upon a comparative study of the political institutions and movements of thought peculiar to the nations of Europe, Latin America and the Far and Middle East. The student's attention is also directed to the problems encountered in international organization, politics and law. The development of political theories from Plato to the present day is an essential part of the department's course offerings. Methods of study include the descriptive, the historical, the legal, the comparative and the philosophical.

Directing its effort to an intelligent understanding of the contemporary world and of the responsibilities which are laid upon citizens of a democracy, the Department of Political Science shares the general objectives of a liberal arts education. While the department does not aim at vocational education, the knowledge it seeks to impart should be useful to anyone contemplating a career in the government service or politics.

Students intending to major in the department should take Political Science 11-12 or 61-62. Ordinarily one of them must be taken before proceeding to more advanced work in the department. This rule may be waived with the consent of the Director of Undergraduate Studies.

The advanced courses are divided into three major groups but no sequence of courses beyond the introductory course is prescribed. The student would be well advised, however, to select some courses from each group.

The Senior Seminar is designed to provide an opportunity for majors in the department to pursue independent study and research, and to qualify for graduation with distinction.

## INTRODUCTORY COURSES

11-12. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. An introductory course for freshmen dealing with the topics indicated in the description of Political Science 61-62. (Open only to Freshmen) 6 s.h. (E & W)

HALL AND SINDLER; CHEEK AND KEARNEY; MORGAN

61-62. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. The first semester is devoted to the study of American constitutional democracy. Topics examined include federal-state relations, the separation and interrelationships of the executive, legislative and judicial branches of government, judicial review, the role of political parties and public opinion, the formulation and execution of domestic and foreign policy, civil liberties. The second semester is devoted to a study of constitutional democracy in Great Britain and France with emphasis upon the similarities and differences between those systems and our own. Detailed attention is also given to an examination of the theory and practice of totalitarian dictatorship as exemplified in the U.S.S.R. 6 s.h. (E & W) (Not open to Freshmen)

CONNERY, LEACH, SIMPSON, AND JEWELL; CHEEK, HOWARD, AND KEARNEY; LOVINK, MORGAN, AND PILANT

## POLITICAL THEORY AND COMPARATIVE GOVERNMENT

123. INTRODUCTION TO POLITICAL PHILOSOPHY.—A course devoted to the reading and discussion of selected political classics including Plato's *Republic,* Aristotle's *Ethics* and *Politics* and other works as time permits. 3 s.h. (W)

HALLOWELL AND LEACH

127. INTRODUCTION TO LAW.—An introduction to the nature and functions of law, with emphasis on the varied uses of law in ordering society, the process of legal growth and the nature of legal reasoning. Some attention will be given to basic issues of jurisprudence. 3 s.h. (W) Open only to Juniors and Seniors.

HOWARD

136. MAJOR EUROPEAN GOVERNMENTS.—A general introductory survey of the governments of Great Britain, France, Germany, Italy, and the Soviet Union. Special attention is given to constitutional developments, the organization and ideologies of political parties, and current political problems. 3 s.h. (W) [Not open to students who have taken Political Science 12 or 62 but open to all others without prerequisite.]

COLE

143. COMPARATIVE GOVERNMENT AND POLITICS: THE MIDDLE EAST.—Political institutions and behavior in the Arab states, Israel, Turkey and Iran. 3 s.h. (W)

PROCTOR

151. COMPARATIVE GOVERNMENT AND POLITICS: LATIN AMERICA.—A study of politics and government in selected Latin American states, including

Argentina, Brazil, Chile and Mexico. Political forces and their impact upon governmental institutions. 3 s.h. BALL

180. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA I.—An introduction to the civilization of the Indian subcontinent—the rise and decline of Mughal rule, British rule, the partition of 1947, and the rise of independent India. 3 s.h. (w) BRAIBANTI

181. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA II.—An introduction to the Muslim component of Indian civilization. Particular attention will be given to the development of a political system in Pakistan. Some attention will also be given to Ceylon and Malaya. 3 s.h. (w) BRAIBANTI

182. COMPARATIVE GOVERNMENT AND POLITICS: JAPAN.—Although Chinese civilization will be studied as it relates to Japan, primary emphasis will be on the development of Japan's political system, starting with the Taikwa Reform and continuing to the present day. 3 s.h. (w) BRAIBANTI

183. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHEAST ASIA.—An analysis of the development of government in Thailand, Vietnam, Burma, Malaya, Indonesia and the Philippines. Attention will be given to the Islamic, Buddhist and other indigenous cultures of these nations. 3 s.h. (w) KEARNEY

223. POLITICAL THOUGHT TO THE SEVENTEENTH CENTURY.—A survey from the time of Plato to the close of the sixteenth century; Graeco-Roman, Patristic and Germanic thought; individualism and cosmopolitanism; effect of the Church-State controversy and the conciliar movement; medieval constitutionalism; legislative sovereignty. 3 s.h. (w) WILSON AND HALLOWELL

224. MODERN POLITICAL THEORY.—An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 s.h. (w) HALLOWELL

225. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 s.h. (w) COLE

226. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 s.h. (w) COLE

229. RECENT AND CONTEMPORARY POLITICAL THEORY.—The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 s.h. (w) HALLOWELL

231. AMERICAN POLITICAL THEORY.—An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 s.h. (w) HALLOWELL

235. THE BRITISH COMMONWEALTH.—An analysis of the political relationships between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. 3 s.h. (w) COLE

250. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA I.—Political development of the Indo-Pakistan subcontinent until the partition of 1947 and the development of India after that date. Attention will be given to the structure of Indian society and to political problems under British rule. Principal emphasis will be on the development of India as an independent state and on the relationship of politics to economic development. 3 s.h. (w) BRAIBANTI

251. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA II.—A continuation of Political Science 250 with chief emphasis on the political development of Pakistan since 1947. Comparative analysis of India and Pakistan. Some attention will also be given to Ceylon and Malaya, as members of the Commonwealth. 3 s.h. (w) BRAIBANTI

252. COMPARATIVE GOVERNMENT AND POLITICS: JAPAN.—A survey of the civilization of Japan, and an analysis of political development from the Taikwa Reforms to the modern period. 3 s.h. (w) BRAIBANTI

260. THE GOVERNMENT AND POLITICS OF THE U.S.S.R.—An analysis of the governmental institutions, party structure and policies of the Soviet Union. Attention will be given to policies affecting the intelligentsia, the workers and the peasants. 3 s.h. KULSKI

AMERICAN GOVERNMENT AND PUBLIC ADMINISTRATION

109. STATE AND LOCAL GOVERNMENT TODAY.—Problems in state, county and city government including the administration of government services such as education, public welfare, law enforcement; inter-governmental relationships; administrative reorganization; methods of popular control; and the reconstruction of state and local government so as to meet present-day needs. 3 s.h. (E) LEACH AND CHEEK

125. AMERICAN POLITICAL PARTIES AND PRACTICAL POLITICS.—A study of the historical development, organization, and methods of political parties in the United States. 3 s.h. (W) SIMPSON

129. GROUPS IN AMERICAN POLITICS.—A study of the composition, methods, and policies of organized groups as they participate in the creation of public opinion and in the formulation of public policy. Attention will be focused on recent national policy in the areas of agriculture, business, labor, education, welfare, foreign affairs, and on the roles that groups play in the formulation of these policies. 3 s.h. (W) SINDLER AND JEWELL

137. POLITICAL BEHAVIOR IN ELECTIONS.—The behavioral approach will be used to examine decision-making in the political process. Attention will be focused on the major factors that affect the outcome of elections, such as the characteristics of the American voter, the conduct of campaigns, the influence of propaganda and public relations techniques, and the influence of campaign finance. 3 s.h. (W) SINDLER AND JEWELL

138. POLITICAL BEHAVIOR IN POLICY MAKING.—A study of the major factors that come into play in the making of governmental policy decisions. Special attention will be paid to the role of pressure groups and the methods of their lobbyist representatives, to the effects of pressures from constituents, and to the pressures of the executive and legislative branches upon each other. 3 s.h. (W)

141. PUBLIC ADMINISTRATION.—An introduction to the role of administration in the governmental process considering principles of administrative organization, methods of administrative control, personnel and fiscal management. In general the study of the organizational and administrative problems encountered by any government agency charged with carrying out a public policy. 3 s.h. (W) HALL

142. ADMINISTRATIVE RESPONSIBILITY.—An evaluation of political, legal and administrative methods of achieving a responsible bureaucracy in American national government. Comparisons will be made with relevant experience and techniques in other countries such as Great Britain and France. 3 s.h. (W) HALL

146. LEGISLATION.—A study of the composition and structures of legislative bodies and of the legislative process with attention to procedure, methods, techniques, delegation of discretion, and the use of controls. 3 s.h. (W) SIMPSON

161. GOVERNMENT AND PLANNING.—A study of the planning functions at all levels of government in the United States. Particular attention will be devoted to the problems posed for planning by metropolitan growth. 3 s.h. (W) LEACH

164. GOVERNMENT REGULATORY POLICY AND ADMINISTRATION.—A consideration of selected regulatory policies of the American national government, such as anti-trust, transportation and communications, and of the administrative procedures and organizations designed to effect those policies. 3 s.h. (W) HALL

174. POLITICAL IMPLICATIONS OF ECONOMIC LEGISLATION.—A study

of political and sectional alignments in the passage of tariff, farm, railway, New Deal and other economic legislation. 3 s.h. (w) SIMPSON

190. CAREER PROBLEMS IN GOVERNMENT.—Principles, techniques, and problems of public service; recent approaches to the teaching of American government and to public personnel practices. 3 s.h. (w) CHEEK

*The course is designed especially for students planning to teach or to enter the government career service.*

207. AMERICAN CONSTITUTIONAL LAW AND THEORY.—A study of the leading principles of American government, as developed through judicial interpretation of the Constitution. 3 s.h. (w) RANKIN

208. AMERICAN CONSTITUTIONAL LAW AND CURRENT NATIONAL PROBLEMS.—A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 s.h. (w) RANKIN

209. PROBLEMS IN STATE AND LOCAL GOVERNMENT IN THE UNITED STATES.—A study of the historical development of state and local governments, their present organization and subdivisions, and their relation to each other. Special attention is given to the position of the states in the federal union through the study of federal-state, inter-state, and state-local relations. 3 s.h. (w) RANKIN

230. AMERICAN POLITICAL INSTITUTIONS.—A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics this course in concerned with the Constitutional Convention of 1787, and the development of Congress, the Presidency, and the Supreme Court. 3 s.h. (w) RANKIN

234. CIVIL-MILITARY RELATIONSHIPS IN AMERICAN GOVERNMENT.—A consideration of the role of the military in American government both in theory and in practice. Special emphasis will be given to formal civil-military structural arrangements for determining policies, such as the National Security Council, and to the degree of civilian control within the military establishment. 3 s.h. (w) CONNERY

241. ADMINISTRATIVE MANAGEMENT.—An advanced course in public administration with special attention being given to the development of scientific management, its application to government in the United States and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 s.h. (w) CONNERY

242. NATIONAL ADMINISTRATION.—A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 s.h. (w) CONNERY

246. GOVERNMENT ADMINISTRATION AND PUBLIC POLICY.—Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in the field of public policy, and their possible solution. 3 s.h. (w) CONNERY

275. THE NATIONAL PARTY SYSTEM.—An intensive examination of selected facets of American national political parties, such as: relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 s.h. (w) SINDLER AND JEWELL

276. COMPARATIVE STATE PARTIES AND POLITICS.—A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organization, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 s.h. (w) SINDLER AND JEWELL

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 3 s.h. (w) RANKIN AND LEACH

292. MUNICIPAL ADMINISTRATION.—A study of principles and methods relating to municipal administration in the United States. 3 s.h. (w) RANKIN AND LEACH

## INTERNATIONAL LAW AND RELATIONS

121. ELEMENTS OF INTERNATIONAL RELATIONS.—Analysis of international politics, of foundations of national power, and of international cooperation, with emphasis upon attempted solutions of the central problems of international security. 3 s.h. (E & W) PROCTOR AND KEARNEY

122. MODERN INTERNATIONAL POLITICS.—An examination of the major problems of post-war international politics with particular attention to the extension of Soviet power, the Western response to this challenge, and the revolutions in the Afro-Asian world. 3 s.h. (E & W) BALL, KULSKI, AND PROCTOR

124. THE NEW STATES OF AFRICA IN WORLD AFFAIRS.—A study of the international political problems arising from the emergence of independent states in sub-Saharan Africa. 3 s.h. PROCTOR

158. CONTROL OF AMERICAN FOREIGN POLICY.—A consideration of the forces which are responsible for the formulation of American foreign policy, and a study of the important factors which have influenced contemporary United States policy in the major areas of the world. The course includes an analysis of the respective roles of the President, Congress, Department of State, and the United Nations, as well as military and public opinion. 3 s.h. (W) PIPER

221. INTERNATIONAL PUBLIC ORGANIZATION.—A study of the structure and functioning of the United Nations organs, of related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 s.h. (W) WILSON

227-228. INTERNATIONAL LAW.—Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 s.h. (W) WILSON

## INDEPENDENT READING AND UNDERGRADUATE SEMINAR

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. (See page 36).

197, 198. SENIOR SEMINAR IN POLITICAL SCIENCE.—A seminar concerned with the development of political science as a discipline, present frontiers of knowledge and research methods. A common problem will be explored and individual papers will be required on selected aspects of that problem. Required of all majors participating in the departmental honors program. Open only to Seniors. Prerequisite: Consent of the instructor. 6 s.h. (W) STAFF

## DEPARTMENTAL MAJOR

*Prerequisite:* Science 11-12 or 61-62.

*Major Requirements:* Eighteen semester hours of work in the Department above courses 11-12 or 61-62, including at least nine semester hours of 200 courses.

*Related Work:* Six hours each in two departments approved by the Political Science adviser. Courses may not be those primarily open to freshmen. Usually related work is taken in the departments of history, economics, sociology or philosophy.

The Department offers work leading to graduation with distinction. See the section on Honors.

# PSYCHOLOGY

PROFESSOR ZENER, CHAIRMAN; PROFESSOR JONES, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS ADAMS, ALEXANDER, DAI, DIAMOND, GUTTMAN, KIMBLE, KOCH; ASSOCIATE PROFESSORS BANHAM, BONEAU, BORSTELMANN, BREHM, MCHUGH, REICHENBERG-HACKETT, WALLACH; VISITING ASSOCIATE PROFESSOR SCHÖNBACH; RESEARCH ASSOCIATE PROFESSOR GAFFRON; ASSISTANT PROFESSORS ALTROCCHI, CARSON, ERICKSON, KREMEN, LAKIN, OBRIST, SCHIFFMAN; LECTURERS COHEN, CROVITZ, GEHMAN, PEELE, SHMAVONIAN; INSTRUCTOR HINMAN

Psychology 91 or its equivalent is a prerequisite for all other courses in psychology. Six semester hours in psychology (including Psychology 91) or special permission of the course instructor or the Director of Undergraduate Studies are required for admission to Psychology 142, 144, 145, 147, 148, 203, 204, 210, 213, 214, 215, 216, 217, 218, 225, 233, 236, 237, 242, 245, 246, 265, 266, 292.

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of psychology through a study of motivation, emotions, perception, sensation, thinking, memory, learning, social behavior, individual differences, and personality. 3 s.h. (E & W) STAFF

100. PERSONALITY AND SOCIAL BEHAVIOR.—A survey of basic psychological principles underlying the study of personality in relation to the social environment. Among the topics discussed are theories of personality, the process of socialization of the individual, factors influencing adjustment to the social environment, the interaction of culture and personality. 3 s.h. (W) ALEXANDER, ALTROCCHI, AND KREMEN

Not open to students who have had Psychology 116.

110. INTRODUCTORY SOCIAL PSYCHOLOGY.—A survey of problems, concepts and methods in the study of social relations and group behavior. Topics to be discussed include: Psychological and socio-cultural factors in the development of motives, values and attitudes; the study of small-group behavior with emphasis on social influence and communication; prejudice and stereotypy. 3 s.h. (E & W) JONES AND BREHM

104. COMPARATIVE PSYCHOLOGY.—An examination of the bearing upon general psychological theory of experimental investigations of animal behavior in the fields of motivation and learning. 3 s.h. (W) ADAMS

108. INTRODUCTION TO BIOLOGICAL PSYCHOLOGY.—The application of biological principles to the study of psychology. Among the concepts considered are species, gene, homeostasis, internal environment, reflex, synapse, organ, and receptor specificity. The topic of phylogeny of the cortex will be treated in some detail. Prerequisite: Zoology 1-2 and Comparative Anatomy, or permission of the instructor. 3 s.h. (W) DIAMOND

110. APPLIED PSYCHOLOGY.—Applications of psychology to problems of personnel selection, industrial efficiency, advertising and selling, and other problems of practical interest. 3 s.h. (W) MCHUGH

111. ADVANCED GENERAL PSYCHOLOGY.—A more intensive study of several selected problem areas in the field of general psychology with special emphasis on experimental methods and findings in the areas considered. 3 s.h. (W) KIMBLE

112. PHYSIOLOGICAL PSYCHOLOGY.—An examination of the biological bases of behavior, considering the functions of the sensory and motor components of the nervous system as well as the problems of emotion, motivation, and consciousness. Prerequisite: Physics 1-2 or Chemistry 1-2 or permission of instructor. 3 s.h. (W) ERICKSON

116. PSYCHOLOGY OF ADJUSTMENT.—The course is planned to give an adequate understanding of problems of adjustment and mental hygiene. Lectures and discussions cover an application of the principles and findings of normal and abnormal psychology, as these relate to the adjustment of the average individual in our changing society. 3 s.h. (W) REICHENBERG-HACKETT

Not open to students who have had Education 68 or Psychology 100.

117. STATISTICAL METHODS IN PSYCHOLOGY.—Elementary statistical techniques and their application to the analysis and interpretation of psychological data. Theory of inference is stressed. 3 s.h. (w) BONEAU AND SCHIFFMAN

118. EXPERIMENTAL METHODS IN PSYCHOLOGY.—The procedures and methods of human and animal experimentation in such areas as learning, motivation, and perception. 3 s.h. (E) STAFF

121. CHILD PSYCHOLOGY.—A survey of theory and research on growth and behavior from infancy to adolescence, with special emphasis upon personality and cognitive development. 3 s.h. BORSTELMANN AND MCHUGH

122. ADJUSTMENT OF THE PRE-SCHOOL CHILD.—Study and application of techniques of observing, recording and interpreting the behavior of the preschool child. The course is designed to meet the needs of students interested in the personality, development and social adjustment of children. One hour lecture and 4 hours laboratory. 3 s.h. (E) REICHENBERG-HACKETT AND MISS HINMAN

126. ADOLESCENT PSYCHOLOGY.—The mental, social and emotional development of adolescence and youth will be studied, with special attention given to such topics as interests, motivations, home problems, sex differences, recreation, delinquency, and development for citizenship. Prerequisite: Psychology 121 or Education 118, or permission of the instructor. 3 s.h. (E) MCHUGH

130. PRINCIPLES AND METHODS OF PSYCHOLOGICAL EVALUATION.—This is an introductory course in test methods used by psychologists in measuring and evaluating mental processes. The nature, purposes and utilization of various types of tests and psychological techniques will be discussed and demonstrated. Among the tests to be studied will be standard scales of intelligence; tests of special abilities, aptitudes, attitudes and interests; personality tests, rating scales and projective methods. Prerequisite: 6 s.h. in Psychology. 3 s.h. (w) BANHAM

132. THE PSYCHOLOGY OF INDIVIDUAL DIFFERENCES.—A study of the nature and causes of individual and group variations in intelligence, special abilities, social and emotional characteristics. These will be considered in relation to developmental sequence, aging factors, sex, race, biological inheritance, education and socio-economic conditions. Prerequisite: Psychology 130 or permission of instructor. 3 s.h. (w) BANHAM

141. PERSONALITY AND BEHAVIOR DISORDER.—Behavior disorder studied from the viewpoint of the psychological principles underlying the adjustment of the deviant personality. Prerequisite: Psychology 100. 3 s.h. (w) ALTROCCHI, CARSON, AND LAKIN

142. INSTRUMENTAL BEHAVIOR.—A laboratory course using animal subjects in operant conditioning situations. Class members carry out a series of observations on conditioning, discrimination, motivation, and other basic phenomena. 3 s.h. (w) GUTTMAN

144. THE PSYCHOLOGY OF LEARNING.—A survey of the basic facts and principles of human and animal learning. Students in the course will perform an independent experiment. Prerequisite: 6 s.h. in psychology or permission of the instructor or Director of Undergraduate Studies. 3 s.h. KIMBLE AND BONEAU

145. EXPERIMENTAL APPROACHES TO PERSONALITY.—Experimental methods applied to personality research with emphasis upon psychological studies in such areas as anxiety, conflict and frustration. Students will perform a series of representative experiments. Prerequisite: 6 s.h. in psychology or special permission of the instructor or the Director of Undergraduate Studies. 3 s.h. (w) WALLACH

147. EXPERIMENTAL SOCIAL PSYCHOLOGY.—Intensive consideration of selected problems in group dynamics, attitude change, and interpersonal perception. Current research and theory are stressed. Class members conduct individual research projects. Prerequisite: Psychology 101 or permission of the instructor. 3 s.h. (w) BREHM AND JONES

148. PSYCHOLOGY OF PERCEPTION AND THINKING.—A study of the basic phenomena of perception and thinking as determined by conditions in the

external situation and in the person, biological and psychological. Students will perform representative experiments. 3 s.h. (w) ZENER AND CROVITZ

151. PSYCHOLOGY AND INTERNATIONAL RELATIONS.—This course will explore the application of psychological theories to problems of international relations including those concerned with inter-group conflict and its resolution, group identification and ethnocentrism, and the complexities of national character. The course will be problem oriented and conducted on a seminar basis. Theoretical papers and experimentation along the lines of topics mentioned above will be expected. Prerequisites: Psychology 91, 100 or 101, and consent of the instructors. BONEAU AND LAKIN

203. PSYCHOLOGY OF PERCEPTION.—An examination of current systematic formulations with emphasis upon the intensive analysis of a variety of representative investigations. 3 s.h. ZENER

204. COMPARATIVE PSYCHOLOGY.—The study of behavior as related to species and of speciation as dependent upon behavior; instinct, imprinting and learning at different phylogenetic levels. 3 s.h. ADAMS

207, 208. INDEPENDENT STUDY AND RESEARCH.—Independent investigations of topics of special interest. Admission requires formulation of a study plan with a faculty supervisor and approval of the Director of Undergraduate Studies. Prerequisite: 9 s.h. of Psychology. 6 s.h. (E & W) BREHM AND STAFF

210. COGNITION AND HIGHER MENTAL PROCESSES.—An intensive analysis of the literature on thinking, problem solving, creativity, language, and related topics. Emphasis is upon the functional significance of these aspects of intellectual activity and upon the experimental methodology involved in their study. 3 s.h. BONEAU

213, 214. CONDITIONING AND LEARNING.—A survey of the literature on classical and instrumental conditioning and other forms of simple learning. Emphasis is on classical conditioning in 213 and on instrumental behavior in 214. 6 s.h. KIMBLE AND GUTTMAN

215. DEVELOPMENTAL PSYCHOLOGY.—A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. Prerequisite: special permission of the instructor. 3 s.h. BORSTELMANN

216. BIOLOGICAL PSYCHOLOGY.—The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy, nad genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potential, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 s.h. DIAMOND

217. RESEARCH METHODS IN SOCIAL PSYCHOLOGY.—Presents the theory and practice of data collection methods in social psychology. Emphasis is on the interplay between design and technique. The methods covered include formal scaling procedures, systematic observational techniques and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 s.h. BREHM

218. SOCIAL PSYCHOLOGY.—An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 s.h. JONES

225. PERSONALITY AND EXPERIMENTAL DYNAMICS.—Application of experimental methods to the study of psychodynamics, personality development, and behavior pathology. Stress is on research in early experience and its influence on personality, frustration, conflict, anxiety, and the mechanisms of defense and adaptation. 3 s.h. STAFF

229, 230. INTRODUCTION TO RESEARCH.—A senior research seminar for advanced students. The student conducts an original investigation under staff supervision. A formal written report of the study will be required. Group dis-

cussions of significant research areas. Prerequisites: Participation by departmental invitation only; restricted to senior majors who have maintained a B average in all courses. Students graduating with distinction in psychology will be selected from among registrants in this course. 6 s.h. (E) BREHM

233. PERSONALITY AND COGNITIVE PROCESSES.—Deals with experimental approaches to expressive behavior, defense mechanisms, the measurement of motives, and stylistic differences in thinking, memory, and perception. 3 s.h. WALLACH

234. SEMINAR IN PERSONALITY.—3 s.h. WALLACH

236. THEORETICAL PSYCHOLOGY.—This course will be devoted to the analysis of techniques of theory construction in psychology. The discussion of these methodological issues will be coordinated with the analysis of concrete formulations in contemporary psychological theory. Prerequisite: 6 s.h. in psychology or special permission of the instructor or the Director of Undergraduate Studies. 3 s.h. (E) KOCH

237. FUNCTIONAL NEUROPHYSIOLOGY.—Considers the mechanisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural systems, and the integrative and associative functions of the nervous system. Laboratory demonstrations and participation. Permission of the instructors. 3 s.h. ERICKSON

238. THE ELECTROENCEPHALOGRAM AND PSYCHOLOGICAL FUNCTION.—A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, reaction time, and attention. Special emphasis is placed on the electrophysiology of conditioning and learning. Lectures, laboratory demonstrations and clinical case presentations. 3 s.h. OBRIST

245, 246. PERSONALITY THEORY AND ASSESSMENT.—An examination of representative models of human functioning from Freud to the present day. Included are examples from psychoanalytical, field theoretical and behavioristic approaches. Laboratory sessions will be concerned with personality assessment of normal human subjects over time. Interview and testing procedures will be introduced and the data gathered assessed against the theoretical models studied. 6 s.h. ALEXANDER

253, 254. PERSONALITY DEVELOPMENT.—3 s.h. BORSTELMAN AND STAFF

265. FUNDAMENTAL STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—Introduction to probability and the use of statistics in description and hypothesis testing in psychology including the following applications: correlational techniques, chi-square and t tests, distribution-free tests and one-way analysis of variance. Prerequisite: Psychology 117-118 or equivalent. 3 s.h. BONEAU

266. ADVANCED STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—The basic theory and application of analysis of variance techniques to complex experimental designs will be covered. Additional advanced techniques, including factor analysis, will be introduced. Prerequisite: Psychology 265 or equivalent. 3 s.h. BONEAU

292. HISTORY OF PSYCHOLOGY.—The history of psychology, particularly in the experimental period of the past century and of its involvement in biology since Darwin. 3 s.h. ADAMS

## DEPARTMENTAL MAJOR

*Prerequisite:* Psychology 91 or equivalent.

*Major Requirements:* For A.B. degree, 24 semester hours in psychology, including Psychology 91 and 117.

For B.S. degree, 24 semester hours in psychology, including Psychology 91, 108 or 112, 117, and a minimum of two courses numbered above 140.

*Related Work:* 18 semester hours which may include certain courses in chemistry, economics, education, English, linguistics, mathematics, philosophy, physics, political science, sociology-anthropology and zoology.

The Department offers work leading to graduation with distinction. See the section on Honors.

## RELIGION

PROFESSOR PRICE, CHAIRMAN; ASSISTANT PROFESSOR WHITE, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR OSBORN, SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS BAKER, BRADLEY, JONES, PHILLIPS, AND POTEAT; ASSISTANT PROFESSORS DANIELS, EFIRD, LANGFORD, MCCOLLOUGH, SULLIVAN, AND WINTERMUTE; DR. CRESSON; MESSRS. CROSSLEY, EAKIN, AND STASSEN

The purpose of the undergraduate program of instruction in religion is to make the students aware of the influence of religion in the history of mankind and in the contemporary world, and to help him appreciate its significance in his own experience. Attention is centered on the Bible, the history and thought of Christianity, and the development of other religious traditions. In addition to the basic courses designed to fulfill the University requirement in religion, advanced courses are offered to meet the needs of specially interested students. In every case the student is encouraged to consider carefully his own religious convictions, to the end that he may reach a more intelligent understanding of his rôle in the world and of his relation to God.

Students who have fulfilled the uniform course requirement in religion are eligible to elect any course numbered 100 or above, except those for which additional prerequisites are prescribed. Courses numbered below 100 may not be taken by those who have completed the uniform course requirements in religion.

1-2. THE ENGLISH BIBLE.—A comprehensive survey of the books of the Old and New Testaments. The literature is examined in the light of its origin in the history and religion of the people of the Bible, in order that its theological significance in its own day and in ours may be understood. Open only to freshmen. 6 s.h. STAFF

51-52. THE ENGLISH BIBLE.—A survey of the Old and New Testaments, similar to Religion 1-2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1-2. 6 s.h. STAFF

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 3 s.h. STAFF

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to his contemporary significance. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 121. 3 s.h. PHILLIPS

85. INTRODUCTION TO CHRISTIAN ETHICS.—An analysis of the Biblical and theological bases for an understanding of man's moral situation, with a study of the social implications of Christianity in selected problem areas. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 152. 3 s.h. MCCOLLOUGH

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 175. 3 s.h. BRADLEY AND SULLIVAN

100. PRINCIPLES OF INVESTIGATION.—An introduction to the resources

and methods appropriate to advanced study in Religion. Required of all majors; open to others. 1 s.h. JONES AND WHITE

111. THE PROPHETS OF THE OLD TESTAMENT.—A study of the origin and rise of the prophetic movements, the message of the prophets in their historical setting, the contributions of this movement to the Biblical view of God and history, and the significance of the prophets for today. 3 s.h. WINTERMUTE

121. THE MISSION AND MESSAGE OF JESUS.—An analysis and interpretation of the Gospels, designed to afford the student a fuller understanding of Jesus and his mission. Not open to students who have received credit for Religion 65. 3 s.h. DANIELS AND PRICE

123. THE LIFE AND LETTERS OF PAUL.—A study of the available sources for the life of Paul, his rôle in the expansion of the Christian movement, the most important aspects of his thought, and his continuing influence. 3 s.h. DANIELS

124. THE EARLY CHURCH FROM PAUL TO IRENAEUS.—Early Christian history through the second century. Special attention is given to Christianity's relation to Rome, and to the developing organization, ministry, and theology of the Church. 3 s.h. PRICE

131. HISTORY OF CHRISTIANITY FROM THE EARLY CHURCH THROUGH THE REFORMATION.—A study of events, trends, personalities, and interpretations that have shaped Christianity from the time of the early Church through the sixteenth century, intended to acquaint the student with the Christian heritage and to contribute to his understanding of contemporary Christianity. 3 s.h. BAKER

133. HISTORY OF CHRISTIANITY SINCE THE REFORMATION.—A study of events, trends, personalities, and interpretations which have shaped Christianity since the Reformation, with emphasis upon those which contribute to an understanding of the contemporary religious situation. 3 s.h. BAKER

135. CHRISTIAN BIOGRAPHY.—A study of the development of Christian thought and practice as reflected in the lives and writings of such key persons as Augustine, Luther, and Wesley. 3 s.h. BAKER AND WHITE

137. PROTESTANTISM IN AMERICA.—A study of representative men, movements, and thought in American Protestantism to 1918. 3 s.h. JONES

138. CONTEMPORARY RELIGIONS IN THE UNITED STATES.—Judaism, Catholicism, and Protestantism are studied with reference to their distinctive beliefs and practices. A comparison is made of common and dissimilar features. 3. s.h. PHILLIPS

140. CHRISTIAN BELIEFS.—An introductory study of important Christian teachings concerning God, Jesus Christ, sin and salvation, etc., intended to serve as a basis for the student's evaluation of his own religious concepts. 3 s.h. LANGFORD AND MCCOLLOUGH

144. PROBLEMS OF RELIGIOUS THOUGHT.—A study of the relation of belief in God to various other types of knowledge and experience, such as the research of natural and social scientists and the facts of suffering, human tragedy, and evil. 3 s.h. LANGFORD AND POTEAT

149. CURRENT INTERPRETATIONS OF CHRISTIANITY.—Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 3 s.h. OSBORN

152. CHRISTIAN ETHICS.—A systematic study of the ethical implications of Biblical religion. Attention is given both to the historical development of the Christian ethic and to the responsibility of the Christian in the various aspects of contemporary social life, such as marriage, the state, race, etc. Not open to students who have received credit for Religion 85. 3 s.h. MCCOLLOUGH

156. CHRISTIAN MARRIAGE AND THE FAMILY.—Marriage and the family in American society studied from the Christian perspective. Attention will be given to the teachings of the churches and of psychologists and sociologists con-

cerning courtship and marriage, sex, parent-child relationships, mixed marriages, and divorce. 3 s.h. PHILLIPS

160. CHRISTIAN EDUCATION.—A study of the educational work of the Church, with emphasis upon the philosophy, objectives and functions of Christian education. 3 s.h. DANIELS

171. RELIGIONS OF THE ANCIENT NEAR EAST.—The history and literature of religions in the cultures of Egypt, Mesopotamia, Persia, and Palestine from earliest times to 600 B.C. 3 s.h. WINTERMUTE

172. RELIGIOUS QUESTS OF THE GRECO-ROMAN WORLD.—The religious movements in the Hellenistic age, including sectarian Judaism, Persian dualism, the mystery cults, and Gnosticism. 3 s.h. WINTERMUTE

175. NON-CHRISTIAN RELIGIONS OF THE MODERN WORLD.—An examination of the beliefs of Islam and the religions of India, China, and Japan. Emphasis will be placed upon the sacred literature, world view, history, and cultural and social significance of the principal non-Christian religions. Not open to students who have received credit for Religion 93. 3 s.h.
BRADLEY AND SULLIVAN

179. MYSTICISM: SACRED AND PROFANE.—Varieties of mystical experience, both religious and non-religious; representative mystics in Hinduism, Islam, Christianity, and Mahayana Buddhism; the nature and significance of mysticism within these traditions. Prerequisite: Religion 93 or 175. 3 s.h. SULLIVAN

187. RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE.—A consideration of the religious insights, explicit and implied, in representative writings. 3 s.h. WHITE

189. MAN IN MODERN PROPHETIC THOUGHT.—The individual and society in the writings of Kierkegaard, Nietzsche, and Berdyaev. 3 s.h.
MCCOLLOUGH

191, 192. INDEPENDENT STUDY.—Directed reading and research. Open only to highly qualified students in the junior year, by permission of the department. 3 s.h. maximum per semester

193, 194. INDEPENDENT STUDY.—Directed reading and research. Open only to highly qualified students in the senior year, by permission of the department. 3-6 s.h. maximum per semester.

195-196. HONORS RESEARCH.—The first semester is a seminar in which methods of research are applied to selected problems in religion; in the second semester, independent research projects are reported to the class, and eventuate in research papers. Normally taken in the junior year. 6 s.h. PRICE

*Senior Seminars.* The following seminars parallel the five categories of courses offered in the department. They afford opportunities for more intensive reading and individual research. Each major must take one of these courses in his senior year; they are open also to qualified non-majors. To be eligible for a seminar the student (major or non-major) must have completed at least one course in this area or pass the qualifying examination on the departmental reading list in that category. Each seminar will be offered as frequently as student demand and available personnel permit.

203. BIBLICAL STUDIES.—3 s.h.

204. CHURCH HISTORY.—3 s.h.

205. THEOLOGY AND ETHICS.—3 s.h.

206. CHRISTIANITY AND CULTURE.—3 s.h.

207. HISTORY OF RELIGIONS.—3 s.h.

228. THE THEOLOGY OF THE GOSPEL AND THE EPISTLES OF JOHN.—A study of the origin of these writings, the provenance of their thought forms and symbolism, their influence on the early Church, and their contemporary significance. Prerequisite: permission of the instructor. 3 s.h. PRICE

248. THE THEOLOGY OF KARL BARTH.—An historical and critical study of the theology of Karl Barth. Prerequisite: permission of the instructor. 3 s.h.
OSBORN

260. WESLEY STUDIES.—The lives and thought of John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Prerequisite: permission of the instructor. 3 s.h. BAKER

270. THE RELIGION OF THE HINDUS.—Hinduism studied through its religious literature from the Vedic period to modern times. Attention will center on ways of salvation in philosophical and epic literature, heresies and sects, Muslim influences, and the role of religion in modern India. Prerequisite: permission of the instructor. 3 s.h. BRADLEY

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as History 285.) Prerequisite: permission of the instructor. 3 s.h. SULLIVAN

272. ORIGINS OF INDIAN CIVILIZATION.—A study of the formation of the classical civilization of the Indian subcontinent from the prehistoric Indus Age to the Gupta Period (4th century A.D.). Attention will be given to the development of political, economic, social and religious movements and institutions. 3 s.h. SULLIVAN

### DEPARTMENTAL MAJOR

*Prerequisite:* Completion of the uniform course requirement in religion. (The sequence Religion 1-2 or 51-52 is recommended.)

*Major Requirements:* Twenty-five semester hours selected as follows:

A. Religion 100 (to be taken in the semester after becoming a major).
B. Three hours from each of the following categories: (A major may fulfil, without credit, the requirement in any one of these areas by passing the departmental examination on the basic book list for that category).
   1. Biblical studies: 111, 121, 123, 124, 228
   2. Church history: 131, 133, 135, 137, 138, 260
   3. Theology and ethics: 140, 149, 152, 156, 248
   4. Christianity and culture: 144, 187
   5. History of religions: 171, 172, 175, 179, 270
C. A three hour senior seminar in one of the five categories.
D. At least six hours elected from the departmental curriculum.

*Related Work:* Eighteen semester hours, including a minimum of six hours in each of two departments. There is no restriction in principle as to departments in which related work may be taken. The departmental major adviser will take into consideration the vocational objective of the student and the need to select courses which will strengthen his major work.

The Department offers work leading to graduation with distinction which is normally begun in the junior year. See the section on graduation with distinction in this *Bulletin*.

## ROMANCE LANGUAGES

PROFESSOR DAVIS, CHAIRMAN; PROFESSOR DOW, DIRECTOR OF UNDERGRADUATE STUDIES IN FRENCH; PROFESSOR FEIN, DIRECTOR OF UNDERGRADUATE STUDIES IN SPANISH; ASSOCIATE PROFESSOR CORDLE, SUPERVISOR OF FRESHMAN INSTRUCTION IN FRENCH; ASSOCIATE PROFESSOR TORRE, SUPERVISOR OF FRESHMAN INSTRUCTION IN SPANISH; PROFESSORS CASTELLANO, CHERPACK, PREDMORE, AND WARDROPPER; ASSOCIATE PROFESSORS GRANT AND VINCENT; ASSISTANT PROFESSORS BARLOW, BUSH, CASTELLANO, DOW, FLINT, HULL, MILLER, RIPLEY, TÉTEL, AND WALKER; INSTRUCTORS DANIEL, GOODHAND, PERRY, AND WINECOFF; BATTLE, GLENN, GOODE, TERRY, MRS. BRYAN, MRS. GRANT, MRS. HULL, AND MISS UPCHURCH

French 63-64 and Spanish 63-64 are the prerequisites for all elective courses. Students who, by reason of foreign residence, have had special opportunities in French or Spanish must be classified by the Director of Undergraduate Studies.

## FRENCH

1-2. ELEMENTARY FRENCH.—Introduction to understanding, speaking, reading, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & W)
GRANT AND STAFF

63-64. INTERMEDIATE FRENCH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or two years of high-school French. 8 s.h. (E & W)
WALKER AND STAFF

91, 92. INTRODUCTION TO FRENCH LITERATURE.—Readings from representative French authors. Development of skill in rapid reading correlated with discussion in French of content and ideas. Prerequisite: French 63-64 or equivalent. 6 s.h. (E & W) CHERPACK AND STAFF

94. FRENCH LITERATURE AND MUSIC IN THE NINETEENTH AND TWENTIETH CENTURIES. COMMON DENOMINATORS IN ARTISTIC CREATION.—Developments in literature and music from the end of the classical period to the present. Readings from Chateaubriand, Hugo, Balzac, Baudelaire, Mallarmé, Becket, and others. Compositions of Beethoven, Berlicz, Debussy, Messiaen, and Boulez. May be substituted for French 92 to satisfy minimum uniform requirements. Not open for credit to those who have completed French 92. 3 s.h. (W) HAMILTON (Department of Music) AND RIPLEY

97. SPOKEN FRENCH.—Intensive instruction in the spoken language: contemporary French prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: French 64. 3 s.h. (E)
MME. BRYAN, DOW, BUSH, AND GOODHAND

104. THE SIXTEENTH CENTURY.—An introduction to the spirit of the French Renaissance as reflected in the literature of the age of Rabelais and Montaigne, Ronsard and Du Bellay. 3 s.h. (E) VINCENT

106. THE WORLDS OF ROUSSEAU.—Studies of Rousseau's conception of the real world (the *Discours*), the ideal world (*Emile and the Contrat Social*), the fictional world (*La Nouvelle Héloïse*), and his personal world (the *Confessions* and the *Rêveries*). 3 s.h. (E) CHERPACK

107. THE WORLDS OF VOLTAIRE.—Studies of Voltaire's conception of the real world (historical, philosophical, and satirical writings), his aesthetic world (poetry, drama, criticism), and his personal world (correspondence). 3 s.h. (E)
CHERPACK

108. FRENCH ROMANTICISM.—The beginnings of the modern era, in its quest for new values and a new expression, as studied through the great lyric poets and prosodists of the first half of the nineteenth century. Readings from Chateaubriand, Lamartine, Musset, Hugo, Vigny and others. 3 s.h. (E) GRANT AND RIPLEY

109. TOWARD MODERNISM IN FRENCH POETRY.—An introduction to modern trends in the nineteenth century: emergence from traditional Romanticism; Art for Art's Sake and the Parnassians (Gautier, Leconte de Lisle); the transition from Decadence to Symbolism (Baudelaire, Verlaine, Rimbaud, and Mallarmé). 3 s.h. (E) BARLOW

111. FRENCH DRAMA OF THE NINETEENTH CENTURY.—A survey of the French theatre from the Romantic period to the *Théâtre libre*. 3 s.h. (E) DOW

112. FRENCH DRAMA OF THE TWENTIETH CENTURY.—Reading of representative plays selected from the works of Bernstein, Maeterlinck, Romains. Sarment, Vildrac, J.-J. Bernard, Claudel, Lenormand, Pagnol, Giraudoux, Anouilh, and others. 3 s.h. (E) DOW

113. THE CLASSICAL IDEAL.—The cultural hegemony of France in seventeenth century Europe. The classical masterpieces as the rational focus of her vigorous thought and art. Descartes, Pascal, Corneille, Racine, Molière, and others. 3 s.h. (E) WALKER

127, 128. ADVANCED COMPOSITION AND CONVERSATION.—During the

first semester elements of syntax are briefly reviewed, along with constant drill in the conversational idiom. In the second semester, there are exercises in free composition with intensified treatment of pronunciation and diction. 6 s.h. (E)
MRS. DOW, TÉTEL, AND VINCENT

134. CONTEMPORARY FRENCH LIFE AND THOUGHT.—An introduction to the essential currents in French thought since 1895. Representative literary works are used as a basis for analysis and discussion of the contemporary scene. 3 s.h. (W) CORDLE AND BUSH

191, 192. INDEPENDENT STUDY.—Open only to highly qualified juniors by permission of the Department. See page 36.

193, 194. INDEPENDENT STUDY.—Open only to highly qualified seniors by permission of the Department. See page 36.

209. ADVANCED COMPOSITION AND SYNTAX.—A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 s.h. (W) HULL

210. FRENCH PHONETICS.—The phonemic structure of contemporary French. Sounds, intonation. Practice in transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 s.h. (W) HULL

213. FRENCH CLASSICISM.—Its initial phase. Readings from Malherbe, Balzac, Voiture, Descartes, Corneille, Molière, and others. 3 s.h. (W) CHERPACK

214. FRENCH CLASSICISM.—Its maturity. Readings from Pascal, Racine, La Fontaine, La Rochefoucauld, Boileau, Bossuet, Madame de Sévigné, La Bruyère, Saint-Simon, and others. 3 s.h. (W) CHERPACK

219. OLD FRENCH LITERATURE.—An introduction to the reading of medieval French literary texts. 3 s.h. (W) VINCENT

221. THE NINETEENTH CENTURY FRENCH NOVEL.—The initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 s.h. (W) GRANT

222. THE NINETEENTH CENTURY FRENCH NOVEL.—A continuation of 221. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 s.h. (W) GRANT

225, 226. FROM RENAISSANCE TO BAROQUE IN FRENCH LITERATURE OF THE SIXTEENTH CENTURY.—First semester: literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: poetry and theater. Readings from Marot, Scève, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. 6 s.h. (W) TÉTEL

241, 242. FRENCH LITERATURE AND THOUGHT IN THE AGE OF ENLIGHTENMENT.—First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: the crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 s.h. (W) CHERPACK

245. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—The metamorphoses of Symbolism. A study of the work of Proust, Gide, and Claudel. 3 s.h. (W) CORDLE

246. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—The Existentialist conversion. A study of the work of Malraux, Sartre, and Camus. Extensive readings from the varied works of the three writers. 3 s.h. (W) CORDLE

## ITALIAN

181-182. ITALIAN.—Intensive introduction to the language. Modern readings. Completion of the second college year of another foreign language will normally be required as a prerequisite. 6 s.h. (E) TÉTEL

## PORTUGUESE

181-182. PORTUGUESE.—Intensive introduction to the language. Modern readings. Completion of the second year of another foreign language will normally be required as a prerequisite. 6 s.h. (W) MILLER

## SPANISH

1-2. ELEMENTARY SPANISH.—Introduction to understanding, speaking, reading, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & W) MILLER AND STAFF

63-64. INTERMEDIATE SPANISH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or two years of high-school Spanish. 8 s.h. (E & W) FLINT AND STAFF

91, 92. INTRODUCTION TO SPANISH LITERATURE.—Readings from representative Spanish authors. Development of skill in rapid reading correlated with discussion in Spanish of content and ideas. Prerequisite: Spanish 63-64 or equivalent. 6 s.h. (E & W) CASTELLANO AND STAFF

97. SPOKEN SPANISH.—Intensive instruction in the spoken language: contemporary Spanish prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Spanish 64. 3 s.h. (E) PREDMORE, FLINT, AND MILLER

156. REPRESENTATIVE WRITERS OF SPANISH AMERICAN LITERATURE.—Study of works which are examples of the principal literary currents after 1880, with particular reference to their relationship to social ideas and problems in the same period. 3 s.h. (E) FEIN

161. SPANISH LITERATURE OF THE RENAISSANCE AND THE BAROQUE.—A study of selected works of the sixteenth and seventeenth centuries with attention to their reflection of social, religious, and political ideas. 3 s.h. (E) MILLER

162. SPANISH ROMANTICISM.—A study of the romantic spirit in modern Spanish literature. 3 s.h. (E) TORRE

164. SPANISH CIVILIZATION.—This course is designed to develop an understanding of the Spanish cultural heritage through the study of selected historical, literary and artistic materials. 3 s.h. (E) FLINT

165. ANALYSIS OF GREAT SPANISH AUTHORS.—A close textual study of a few literary texts with some consideration of methods of literary criticism. The course is designed to give the student insight into various ways of interpreting and understanding literary works so that his experience of literature in general may be enriched. 3 s.h. (E) WARDROPPER

176. ADVANCED CONVERSATION.—This course is designed to develop facility of expression through constant drill on vocabulary and conversational idiom. Time will be devoted to a review of the essentials of Spanish syntax. Prerequisite: Spanish 97 or permission of the instructor. 3 s.h. (E) CASTELLANO

191, 192. INDEPENDENT STUDY.—Open only to highly qualified juniors by permission of the Department. See page 36.

193, 194. INDEPENDENT STUDY.—Open only to highly qualified seniors by permission of the Department. See page 36.

251. THE ORIGINS OF THE SPANISH NOVEL.—A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: *Amadís de Gaula,* Diego de San Pedro's *La cárcel de amor,* the *Abencerraje,* the *Lazarillo,* Montemayor's *Diana.* 3 s.h. (W) WARDROPPER

252. SPANISH LYRIC POETRY BEFORE 1700.—A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor, la poesía de tipo tradicional,*

and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 s.h. (w) WARDROPPER

253. THE ORIGINS OF THE SPANISH THEATER.—A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century) through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres, Naharro, Lope de Rueda, Juan de la Cueva. 3 s.h. (w) WARDROPPER

255. MODERN LATIN AMERICAN LITERATURE.—The coming of age of Latin American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 s.h. (w) FEIN

256. CONTEMPORARY LATIN AMERICAN LITERATURE.—Trends in Latin American literature after the Modernist movement. Analysis of significant works in various genres. 3 s.h. (w) FEIN

258. OLD SPANISH LITERATURE.—An introduction to the reading of medieval Spanish literary texts. 3 s.h. (w) DAVIS

259. SPANISH PHONETICS.—A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. 3 s.h. (e) CASTELLANO

260. ADVANCED COMPOSITION AND SYNTAX.—Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. Prerequisites: Spanish 176 or permission. 3 s.h. (e) CASTELLANO

261. NINETEENTH CENTURY NOVEL.—A study of literary and social trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo, Bazán, Blasco Ibáñez, and their contemporaries. 3 s.h. (w) DAVIS

264. MODERN AND CONTEMPORARY SPANISH THEATRE.—A brief review of the modern and contemporary Spanish theatre from the period of Romanticism. Lectures, reading, and discussion of the most representative works of Benavente, Martínez Sierra, los hermanos Quintero, etc. 3 s.h. (e) CASTELLANO

265. GOLDEN AGE LITERATURE: CERVANTES.—The life and thought of Cervantes with special emphasis on his *Quijote*. 3 s.h. (w) PREDMORE

266. GOLDEN AGE LITERATURE: THE DRAMA.—A study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 s.h. (w) CASTELLANO

275. CONTEMPORARY SPANISH LITERATURE: ESSAY AND LYRIC POETRY.—A study of the revision of national values and literary expression in the twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extrapeninsular influences. 3 s.h. (w) PREDMORE

276. CONTEMPORARY SPANISH LITERATURE: NOVEL.—A study of tradition and innovation in the twentieth century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 s.h. (w) PREDMORE

## ROMANCE LANGUAGES

RL 211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance Literature has been divided and studied, with analyses of selected texts. 3 s.h. (w) CHERPACK

RL 218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college level; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 3 s.h. (e) DOW

RL 224. ROMANCE LINGUISTICS.—The origin and development of the Romance languages from spoken Latin to the modern standard languages and

local dialects. Introduction to the structural method as applied to historical and comparative linguistics. Prerequisite: French 219, Spanish 258, or permission of instructor. 3 s.h. (w) HULL

### DEPARTMENTAL MAJOR

*Prerequisites:* French or Spanish: 63-64 or equivalent.

*Major requirements:* For French:

2) 127 or 128
3) 209 or 210
4) A minimum of 15 hours of courses in literature including six hours above 200. All majors must take one of the following: 113, 213, 214.

For Spanish: 1) 97
2) 176
3) 259 or 260
4) A minimum of 15 hours of courses in literature including six hours above 200. All majors must take one of the following: 161, 251, 252, 253, 265, 266.

The Department offers work in the junior and senior years leading to graduation with distinction. See the section on Honors in this *Bulletin*.

### RELATED WORK

Majors in Romance Languages will select, with approval of the Director of Undergraduate Studies, appropriate courses from the following fields: (1) other languages and literature; (2) history; (3) philosophy; (4) appreciation courses in music and art; (5) linguistics; and occasionally from other fields deemed suitable.

## RUSSIAN

ASSOCIATE PROFESSOR JEZIERSKI; ASSISTANT PROFESSOR M. PAVLOV; ASSISTANT PROFESSOR H. PAVLOV, MR. DUDA; SWAN AND MISS SALVÉ

1-2. ELEMENTARY RUSSIAN.—Introduction to understanding, speaking, reading and writing. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (w) STAFF

63-64. INTERMEDIATE RUSSIAN.—Intensive classroom and laboratory practice in spoken and written patterns. Reading in contemporary literature. Prerequisite: Russian 1-2, or two years of high school Russian. 8 s.h. STAFF

91-92. ADVANCED RUSSIAN.—Systematic study of syntax and style in the written and spoken language. Readings of nineteenth and twentieth century authors. Oral and written reports. Conducted in Russian. Prerequisite: Russian 63-64, or equivalent. 6 s.h. (w) PAVLOV

97, 98. SPOKEN RUSSIAN.—Intensive instruction in the spoken language: contemporary Russian prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Russian 92. 3 s.h. M. PAVLOV

101, 102. RUSSIAN LITERATURE AND CULTURE THROUGH THE NINETEENTH CENTURY.—Russian prose, poetry and criticism, with special attention to more recent periods. Readings (from *The Igor Tale* to Blok) in English. Lectures and class discussion. 6 s.h. (w) JEZIERSKI

103. SOVIET LITERATURE AND CULTURE.—Literature since 1917, as a continuation of nineteenth-century traditions and as a response to Soviet ideology. Readings (in English or Russian) from major works of prose, poetry and drama. 3 s.h. (w) JEZIERSKI

105. THE RUSSIAN THEATRE AND DRAMA.—Russian drama from its beginnings to contemporary practice. Lectures, class, discussions, readings of plays (Pushkin to Majakovskij) in English or Russian. 3 s.h. (w) JEZIERSKI

112. PUSHKIN AND THE BIRTH OF RUSSIAN REALISM.—An intensive study of the works of Russia's greatest poet. Readings in English or Russian. Prerequisite: Russian 101 or instructor's consent. 3 s.h. (w)

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. (See page 36.)

201, 202. THE NOVELISTS OF NINETEENTH CENTURY RUSSIA.—Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English or Russian. Lectures, oral reports, class discussions and term paper. 6 s.h. (w) JEZIERSKI

### DEPARTMENTAL MAJOR

*Prerequisite:* Russian 1-2

*Major Requirements:* Russian 63-64 and 18 semester hours in the department including 91-92 and at least 6 semester hours of senior-graduate courses.

*Related Work:* 18 semester hours chosen with the approval of the department from the humanities, history and the social sciences.

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR MCKINNEY, CHAIRMAN; ASSOCIATE PROFESSOR ROY, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BACK, LABARRE, AND THOMPSON; ASSOCIATE PROFESSORS KERCKHOFF, MADDOX, ROWE, PREISS, AND SMITH; ASSISTANT PROFESSORS SIMPSON, WHITRIDGE, AND WINSBOROUGH

Sociology 91 or 92, or the equivalent or special permission of the instructor or of the Director of Undergraduate Studies, is a prerequisite for all courses at the 100 and 200 levels, except 131, 132, 133, 192, 230, 232, 234, and 236.

91. INTRODUCTION TO SOCIOLOGY: CONCEPTS AND PROCEDURES.—Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. 3 s.h. (E & W) Open to Freshmen. STAFF

92. INTRODUCTION TO SOCIOLOGY: SOCIOLOGICAL STUDIES.—Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 3 s.h. (E & W) STAFF

93. GENERAL ANTHROPOLOGY.—Origins and distribution of mankind; a survey of human palaeontology and human biology, world archaeology, prehistory and languages; and the origins of the family, primitive economics, arts, social and political organization. Special attention is given to primitive people. 3 s.h. (W) LABARRE AND ROWE

94. CULTURAL ANTHROPOLOGY.—A study of the dynamics of culture, the causal factors, functions, integration and disintegration, diffusion, growth and change of cultures. Emphasis is upon the simpler societies. 3 s.h. (W) LABARRE AND ROWE

130. CULTURAL CHANGE AND STABILITY.—Contemporary theories of culture change, especially those resulting from acculturation and from implementation of programs of technical and economic aid; a consideration of the factors significant in maintaining stability or stimulating change in traditional cultures. 3 s.h. (W) ROWE

131. PEOPLES OF THE WORLD: AMERICAN INDIAN.—A comprehensive survey of the Indians of North and South America, including a study of origins and prehistory, archaeology, physical anthropology, languages, material culture, social and political organization, economics and religion, discussed in terms of the "culture area" concept. 3 s.h. (W) LABARRE

132. PEOPLES OF THE WORLD: AFRICA AND OCEANIA.—A comprehensive survey of the non-European peoples of Africa and Oceania, covering available prehistory, archaeology, racial affiliations, languages, material culture, social and political organization, economics and religion, discussed in terms of the "culture area" concept. 3 s.h. (W) LABARRE

133. PEOPLES OF THE WORLD: ASIA.—A comprehensive survey focusing on the peoples and societies of South, Southeast and East Asia, including the prehistoric, ethnic, linguistic, religious and political foundations of the complex civilizations; the response of traditional Indian, Chinese and Japanese cultures to the West. 3 s.h. (w) ROWE

142. THE SOCIOLOGY OF MASS COMMUNICATION.—An analysis of the role of radio, the press, magazines, movies and television in modern societies. An examination of the selective audiences, content characteristics, controlling elements, and organizational structure of the various media of mass communication. 3 s.h. (w) SMITH

145. URBAN SOCIOLOGY.—Using historical, demographic, and ecological materials for background, urban society is studied with respect to its institutions, interactional patterns, differentiation, integration, disorganization, and decentralization. 3 s.h. (w) SMITH

146. INDUSTRY AND SOCIETY.—A study of industrial institutions in their interrelationships with other forms of social behavior in the broad cultural setting of western civilization. Attention will center upon analysis of specific social problems resulting from the impact of industrial change. 3 s.h. (w) ROY

150. THE FAMILY.—Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. (w) KERCKHOFF

153. SOCIOLOGY OF THE SOUTH.—The developing regional organization of the world economy studies with especial reference to Southern life. A survey of the composition and distribution of population, races and race relations. Primary emphasis is upon social change. 3 s.h. (w) THOMPSON

154. THE SOCIOLOGY OF THE ARTS.—An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations and art works as they function in their social-cultural milieux. 3 s.h. (E) WHITRIDGE

155. INTRODUCTION TO INDUSTRIAL SOCIOLOGY.—An analysis and appraisal of the various factors that affect human relations in industry. The interpersonal and intergroup relationships within the individual industrial unit which determine its efficiency as an economic and social institution and the social conditions in the community as they affect social relations. 3 s.h. (w) ROY

159. THE NEGRO IN AMERICA.—A study of the history and changing status of the Negro regarded as a symbol and protagonist of minority groups in America and elsewhere. 3 s.h. (w) THOMPSON

172. COLLECTIVE BEHAVIOR AND SOCIAL MOVEMENTS.—Examination of disruptive and relatively unorganized aspects of social phenomena such as crowd behavior, fads, rumors, crazes and social movements as indexes of social disequilibrium and potential sources of social change. 3 s.h. (w) KERCKHOFF

191. PRINCIPLES OF SOCIAL CASE INVESTIGATION.—A non-professional course designed to acquaint the students with the basic research techniques employed in the case study of the interrelationships of personality and culture in various fields of sociological and anthropological interest. 3 s.h. (E) WHITRIDGE

199. INDEPENDENT STUDY.—This course is designed to provide an opportunity for directed reading and research on selected sociological problems. Required of, but not restricted to, candidates for graduation with distinction in the department and normally taken in the senior year. Prerequisite: Consent of the instructor. 3 s.h. (w) STAFF

230. SOCIETY AND CULTURE IN INDIA.—The basic features of Indian cultures and societies from an anthropological perspective. The impact of selected technological and social changes upon the individual, caste, and community. 3 s.h. (w) ROWE

232. PRIMITIVE RELIGION.—The ethnography, the social functions, and the sociopsychological meanings of religion in primitive societies. 3 s.h. (w) LABARRE

234. PERSONALITY AND SOCIETY.—The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 s.h. (w) LABARRE

236. PERSONALITY AND CULTURE.—The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comparative anthropological materials will be drawn upon. Prerequisite: Course 234. 3 s.h. (w) LABARRE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political, and prestige structures in modern societies. The interrelationship of class, status, and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 s.h. (w) ROY AND SIMPSON

242. THE SOCIOLOGY OF OCCUPATIONS AND PROFESSIONS.—The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 s.h. (w) MCKINNEY

245. DEVIANT SOCIAL BEHAVIOR.—Analysis of deviant behavioral systems (illness, crime, delinquency, etc.) in terms of a) precipitating social factors, b) patterns and goals, c) remedial and counter-acting controls. 3 s.h. (w) PREISS

247. COMMUNITY AND SOCIETY.—This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, and news, mass behavior, social problems, races, and classes. 3 s.h. (w) THOMPSON

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function, and importance of institutions in society. 3 s.h. (w) THOMPSON AND SIMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as race and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 3 s.h. (w) THOMPSON

275. SOCIAL ATTITUDES AND INDIVIDUAL BEHAVIOR.—The importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the importance of membership groups and reference groups. 3 s.h. (w) KERCKHOFF AND BACK

278. SOCIAL STRUCTURE AND THE LIFE CYCLE.—A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 s.h. (w) MADDOX

281. DEVELOPMENT OF SOCIOLOGICAL THEORY.—An analysis of the development, convergence, and utilization of sociological theory. Prerequisite: 15 s.h. credit in sociology. 3 s.h. (w) MCKINNEY AND PREISS

295. METHODOLOGY IN SOCIOLOGY.—Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 units. SMITH

297. STATISTICAL ANALYSIS IN SOCIOLOGY.—Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance, and covariance and factorial design are studied. When possible, analogous non-parametric techniques are also considered. Undergraduates must have at least 15 s.h. and a B average in sociology and obtain the permission of the instructor. 6 s.h. (w) WINSBOROUGH

## DEPARTMENTAL MAJOR

Senior-Graduate courses.

*Major Requirements:* Twenty-four semester hours of work in the Department

including either or both Sociology 91 and 92 and at least six semester hours in the Senior-Graduate courses.

*Related Work:* A minimum of eighteen semester hours, at least twelve of which are normally chosen from two of the following fields: economics, education, history, political science, and psychology. Additional courses in other fields may also be elected as related work when indicated by the educational requirements of the student and approved by the Departmental adviser.

## ZOOLOGY

PROFESSOR HORN, CHAIRMAN; ASSOCIATE PROFESSOR BAILEY, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BOOKHOUT, GRAY, GREGG, MENZIES, K. SCHMIDT-NIELSEN, WILBUR; ASSOCIATE PROFESSORS FLUKE, HUNTER, KLOPFER, LIVINGSTONE, ROBERTS, VERNBERG, AND WARD; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSOR COSTLOW; INSTRUCTORS BERGER, COURTENAY, HAINES, HURST, AND WHIPPLE

1. ANIMAL BIOLOGY.—The principles of biology as applied to animals. 4 s.h. (E & W) KLOPFER AND STAFF

2. GENERAL ZOOLOGY.—A survey of the animal kingdom. Prerequisite: Zoology 1. 4 s.h. (E & W) BOOKHOUT, MRS. HUNTER, AND STAFF

53. COMPARATIVE VERTEBRATE ANATOMY.—A study of the anatomy and evolution of the organ systems of vertebrates. Prerequisites: Zoology 1, 2. 4 s.h. (W) HORN AND STAFF

71. HEREDITY AND EUGENICS.—Effects of environment and heredity upon the individual and populations; intepretation of human genetic histories. Prerequisite: one year of zoology. 3 s.h. (W) WARD

92. GENERAL EMBRYOLOGY.—An introduction to the study of developmental processes. Prerequisite: Zoology 1, 2. Recommended Zoology 53. 4 s.h. (W) GREGG AND STAFF

103. PRINCIPLES OF ECOLOGY.—An introduction to the study of organisms in natural habitats, with particular attention to the growth of animal populations, the chemical role of organisms, energy flow through food chains, and the development of ecological systems through geologic time. Prerequisites: Botany 1, 2 or Zoology 1, 2; Mathematics 17 or 21. 4 s.h. (W) LIVINGSTONE

109. EVOLUTION.—Analysis of the processes of adaptation and evolution in individuals, populations, and genetic systems. Lectures and student reports. Prerequisite: Genetics or consent of the instructor. 3 s.h. (W) KLOPFER

110. INTRODUCTION TO GENETICS.—The principles and practical application of genetics. Prerequisite: one year of zoology or consent of instructor. 3 s.h. With laboratory—4 s.h. (W) WARD

120. ORNITHOLOGY.—Lectures, laboratory and field trips dealing with the classification, adaptations, and natural history of birds. Prerequisite: one year of zoology. Zoology 53 recommended. 4 s.h. (W) BAILEY

151. PRINCIPLES OF PHYSIOLOGY.—An introductory survey of physiological functions. Prerequisites: At least a year of zoology and a year of chemistry. 4 s.h. (W) K. SCHMIDT-NIELSEN

156. VERTEBRATE HISTOLOGY.—The microscopic structure of normal tissues and organs of the vertebrate body. Training will be given in the preparation of material for microscopic study. Prerequisite: Open only to juniors and seniors who have completed two years of zoology. 4 s.h. (W) ROBERTS

161. ANIMAL PARASITES.—An introductory course dealing with biological principles involved in parasitism of animals including man. Prerequisite: one year of zoology. 4 s.h. (W) MRS. HUNTER

196. SEMINAR: CURRENT DEVELOPMENTS IN ZOOLOGY.—Open to senior departmental majors. 2 s.h. (W) STAFF

197, 198. SPECIAL PROBLEMS.—Senior and Junior majors who have had proper training may be permitted to carry on special work. Permission must be obtained from the Director of Undergraduate Studies and the instructor under whom the student wishes to work. Not more than 4 s.h. may be counted toward major work. (w) STAFF

FOR SENIORS AND GRADUATES

201. ANIMAL BEHAVIOR.—A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: Physiology, Genetics and Evolution, or consent of instructor. 3 s.h.; 4 s.h. with laboratory. (w) KLOPFER

203. ECOLOGY.—Relation of animals to environment. Lectures, readings, reports, conferences; laboratory and field work. 4 s.h. (w) GRAY

210. EXPERIMENTAL GENETICS.—The relationship of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Prerequisites: Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent), or consent of instructor. 4 s.h. (w) WARD

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 4 s.h. (Given at Beaufort only.) MENZIES

216. LIMNOLOGY.—A study of lakes, ponds and streams, including their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities living in them. Lectures, field trips, and laboratory work. Usually offered in alternate years. Prerequisites: one year each of biology, chemistry and physics, and mathematics 21; or permission of instructor. 4 s.h. (w) LIVINGSTONE

222. ENTOMOLOGY.—Anatomy, physiology, embryology, and classification of insects. Prerequisite: One year of zoology. 4 s.h. (w) GRAY

224. VERTEBRATE ZOOLOGY.—A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 s.h. (w) BAILEY

228. EXPERIMENTAL EMBRYOLOGY.—Lectures, readings, reports, and laboratory work. 4 s.h. GREGG

238. SYSTEMATIC ZOOLOGY.—The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisites: Zoology 1, 2. 4 s.h. (w) BAILEY

243. CYTOLOGY.—The structure of the cell. Lectures, readings, reports, and laboratory work. Prerequisites: Zoology 53, 92, 156 or equivalent and consent of instructor. (Combined course with Botany 203.) 4 s.h. ROBERTS

245. RADIATION BIOLOGY.—Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: College physics, mathematics and organic chemistry. 3 s.h., or 4 s.h. with laboratory. (w) FLUKE

246. MOLECULAR BIOLOGY.—The nature, functional relationships, and replication of biological structure at the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 s.h., or 4 s.h. with instructor's advance approval of laboratory work. (w) FLUKE

247. BIOLOGICAL NUCLEONICS.—Laboratory instruction in biological uses of radioactive tracers, in counting instruments and measurements, and in legal requirements. Prerequisites: By consent of instructor and normally two years of biology and one year of college chemistry. 2 s.h. (w) FLUKE

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental

factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. (Given at Beaufort only.) VERNBERG

252. COMPARATIVE PHYSIOLOGY.—The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 s.h. (w) K. SCHMIDT-NIELSEN

253. ADVANCED VERTEBRATE MORPHOLOGY.—Descriptive and experimental studies in comparative vertebrate morphogenesis. Prerequisites: Zoology 53, 92. 4 s.h. (w) HORN

271. CELLULAR PHYSIOLOGY.—The physiological processes of living matter approached through studies of cells. Prerequisites: Two years of biology and at least one year of chemistry. 4 s.h. (w) WILBUR AND MRS. SCHMIDT-NIELSEN

274. INVERTEBRATE ZOOLOGY.—A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Zoology 1, 2. 4 s.h. (w) BOOKHOUT

276. PROTOZOOLOGY.—The morphology, physiology, taxonomy, and culture of protozoa. Prerequisites: Zoology 1, 2. 4 s.h. (w) BOOKHOUT

278. INVERTEBRATE EMBRYOLOGY.—Lectures, readings and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 s.h. (w) BOOKHOUT

MARINE LABORATORY. The following courses are given at Duke University Marine Laboratory, Beaufort, N. C.: 203, Marine Ecology; 214, Biological Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology. Consult the announcement of the Duke University Marine Laboratory.

## DEPARTMENTAL MAJOR

*Prerequisites:* Zoology 1 and 2.

*Major Requirements* (for both A.B. and B.S. degrees): A minimum of 24 s.h. of zoology including at least one course in each of the following three areas: morphology (53, 92, 156, or 278), physiology (151 or 271), and genetics (71 or 110).

With the prior approval of the Director of Undergraduate Studies, up to 6 s.h. of advanced work in the natural and formal sciences, other than zoology, may be counted toward the 24 s.h. of the zoology major.

*Related Work:*

*A.B. Degree:* Related work will include at least one year of chemistry with additional work usually chosen from courses in botany, chemistry, geology, mathematics, or physics. The language requirement will preferably be met by French, German, or Russian.

*B.S. Degree:* Related work will include Chemistry 151 and 152 with additional work chosen from courses in botany, geology, mathematics or physics. Language requirements may be met by two languages, chosen from German, French, or Russian.

The Department offers work leading to graduation with distinction. See the section on Honors.

# College of Engineering

## CIVIL ENGINEERING

PROFESSOR BROWN, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR WILLIAMS; ASSOCIATE PROFESSORS BRYAN AND PALMER; ASSISTANT PROFESSORS ARGES, HAINES, HARRAWOOD, HILL, HOLLAND, AND WOOD; VISITING ASSOCIATE PROFESSOR KUMAR; MESSRS. CHEN, KAO, MOLINA, MOORE, SAXENA, SHEPPARD, AND RAJAN

CE 61. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land surveys; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg. 1 and Math 21. 5 s.h. (w) SHEPPARD

CE 72. MATERIALS LABORATORY I.—Blending of granular materials and determination of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. (w) STAFF

CE 101. MATERIALS LABORATORY II.—Testing of soils, concrete, and bituminous mixtures. Mechanical analyses, compaction, consolidation, triaxial, and stability tests, analysis of test results. Prerequisite: CE 72; concurrent: Engrg. 107. 1 s.h. (w) SHEPPARD

CE S110. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisite: trigonometry; engineering graphics desirable. 3 s.h. (w) ARGES

CE 113. ROUTE SURVEYING.—Simple, compound and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. (w) WILLIAMS

CE 116. TRANSPORTATION ENGINEERING.—Location, design, construction and maintenance of highways and city streets; soil stabilization; traffic studies; economics of planning and design. Prerequisite: CE 113, 135. 3 s.h. (w) WILLIAMS

CE 118. MATERIALS OF ENGINEERING.—Behavior of materials under load; mechanical properties as criteria for failure; elementary metallurgy. Ferrous and non-ferrous metals and non-metalic materials. Prerequisites: Engrg. 107 and 109 2 s.h. (w) WILLIAMS

CE 121. *HYDROLOGY.—Fundamentals of meteorology; precipitation; evaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg. 128. 3 s.h. (w) WILLIAMS

CE 123. HYDRAULIC ENGINEERING.—Pipe flow, compound pipe systems, network analysis, analysis and problems on pumps and turbines, fundamental aspects of hydrology. Open channel flow, non-uniform flow computations. Irrigation and drainage problems. Flood control and hydraulic structures. Prerequisite: Engrg. 128. 3 s.h. (w) WILLIAMS

CE 124. FUNDAMENTALS OF SANITARY ENGINEERING.—Engineering and public health aspects of water treatment and supply waste treatment and disposal, and environmental sanitation. Design basis for collection and treatment facilities. Laboratory procedures and interpretation of results. Prerequisite: Chemistry 2; concurrent: CE 123. 3 s.h. (w) BRYAN

CE 126. *SANITARY ENGINEERING DESIGN.—Design of facilities for pro-

* Offered only upon sufficient demand; enrollment limited.

viding an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisite: CE 124. 3 s.h. (w) BRYAN

CE 131. STRUCTURAL MECHANICS I.—Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg. 107. 3 s.h. (w) BROWN

CE 132. STRUCTURAL DESIGN.—Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring connectors. Design and detail drawings. Prerequisite: CE 131. 4 s.h. (w) PALMER

CE 133. REINFORCED CONCRETE.—Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. (w) BROWN AND PALMER

CE 135. SOIL MECHANICS—Soil identification and classification; elementary soil physics; drainage; exploration; stability of footings and retaining walls; settlement; application of theory to foundation design. Prerequisite: Engrg. 107. 2 s.h. (w) STAFF

CE 140. STRUCTURAL MECHANICS II.—Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 121. 3 s.h. (w) HILL

CE 143, 144. *PROJECTS IN CIVIL ENGINEERING.—This course may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case it may be substituted for certain civil engineering courses. 3-6 s.h. (w) STAFF

CE 146. PROFESSIONAL ENGINEERING.—Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Senior only. 2 s.h. (w) PALMER

CE 148. *STRUCTURAL ENGINEERING.—Structural design utilizing metals, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisites: CE 132 and CE 133. 3 s.h. (w) PALMER

CE 154. *GEOMETRIC THOROUGHFARE DESIGN.—Analysis and design of municipal street systems. Origin-destination surveys; control of traffic flow; grade, rotary, and grade-separation intersections. Prerequisite: CE 113. 3 s.h. (w) WILLIAMS

CE 202. *ADVANCED MECHANICS OF MATERIALS AND EXPERIMENTAL STRESS ANALYSIS.—The analysis of stress and strain in deformable bodies, correlation of theory with data from experiment. Photoelasticity. Strain gages. Similitude. Prerequisite: permission of instructor. 3 units. (w) KUMAR

CE 203. ADVANCED MECHANICS OF MATERIALS.—Analysis of structural elements described by ordinary differential equations such as beams on an elastic foundation, circular plates; applications to elementary problems of plates and shells. Introduction to elasticity and plasticity. Energy methods in elasticity. 3 units. HILL

CE 204. THEORY OF PLATES AND SHELLS.—Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 205. THEORY OF ELASTICITY.—Linear theory of elasticity; solutions of two dimensional problems; three dimensional problems of torsion and bending; elastic wave propagation; energy principles. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 211. BEHAVIOR OF MATERIALS.—Macroscopic mechanical properties of materials for static, fatigue, dynamic, and creep conditions; low and high temperature properties; applications. 3 units. KUMAR

CE 231. STRUCTURAL THEORY AND ANALYSIS.—The application of the

fundamental theories of structural action to the design and analysis of structural members. Specifications. Planning of CE projects. 3 units. BROWN

CE 232. REINFORCED CONCRETE THEORY.—Design and analysis of reinforced concrete members including plates and shells. Prestressed and poststressed concrete members. 3 units. BROWN

CE 235. FOUNDATION ENGINEERING.—The theory and application of soil mechanics to the design and analysis of foundations, subsurface structures, and earth works. 3 units. STAFF

CE 242. *HYDRAULIC ENGINEERING.—Fundamental principles of flow, effects of gravity, viscosity, compressibility, and surface tension of fluid motion in closed conduits and open channels; surface and form resistance; hydraulic similitude. Fundamentals of applied hydrology. 3 units. WILLIAMS AND WOOD

CE 244. *SANITARY ENGINEERING PROCESSES.—Fundamental bases for design of water and waste treatment systems, including: transport, mixing, sedimentation and filtration; gas transfer, coagulation, and bio-treatment processes. 3 units. BRYAN

CE 250. ENGINEERING ANALYSIS.—General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical techniques; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and non-uniform properties and with rigid and non-rigid supports. 3 units. WOOD

The Department offers work leading to graduation with distinction. See the section on Honors.

## ELECTRICAL ENGINEERING

PROFESSOR WILSON, CHAIRMAN; PROFESSOR MEIER, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS SEELEY AND VAIL; ASSOCIATE PROFESSORS ARTLEY, KOEPSEL, KRAYBILL, AND OWEN; ADJUNCT ASSOCIATE PROFESSOR BURGER; ASSISTANT PROFESSORS GEORGE, MCKEEL, AND PILKINGTON; INSTRUCTORS JONES AND HAMMOND; LECTURER OLIVE; MESSRS. CHAMBERS, FENG, HALL, HUNT, JACKSON, LEFLOCH, OWSLEY, PALMER, AND YU

EE 53. ELECTRICAL ENGINEERING FUNDAMENTALS.—Survey of electrical engineering profession: role of engineering and professional engineering societies in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction to staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h. (w) KRAYBILL AND MEIER

EE 55. ELECTRIC NETWORKS I.—Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Prerequisite: Physics 42. Concurrent: Mathematics 63. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 56. ELECTRIC NETWORKS II.—Network impedance and admittance functions; stead-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Mathematics 64. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 109-110. ELECTROMAGNETIC SYSTEMS.—Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic material. Prerequisite: EE 56.

* Offered only upon sufficient demand; enrollment limited.

Concurrent: Mathematics 111. Three class sessions and one two-hour computation. 8 s.h. (w) ARTLEY AND JACKSON

EE 111-112. ELECTRICAL PRINCIPLES LABORATORY.—Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite: EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. (w)
JACKSON, LEFLOCH, AND PALMER

EE 123. FUNDAMENTALS OF ELECTRICAL ENGINEERING.—Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering; principles of electric circuits, fields, and electronics. Prerequisites: Mathematics 63 and Physics 42. Concurrent: EE 125. Three class sessions. 3 s.h. (w) HAMMOND AND HUNT

EE 124. INDUSTRIAL ELECTRICAL ENGINEERING.—Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering: alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. (w)
HUNT

EE 125. ELECTRICAL FUNDAMENTALS LABORATORY.—Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) HAMMOND, HUNT, OWSLEY, AND PALMER

EE 126. INDUSTRIAL ELECTRICAL LABORATORY.—Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) HALL AND OWSLEY

EE 127. *ELECTRONICS FOR ENGINEERS.—Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering: amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. (w) STAFF

EE 159. *TRANSMISSION.—Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110; Mathematics 111. Elective for electrical majors. 3 s.h. (w) SEELEY

EE 165-166. ELECTRICAL ENGINEERING SEMINAR.—A course which provides an opportunity to consider matters related to the professional practice of electrical engineering; to relate the undergraduate program of studies to current practice; and to improve the ability to communicate more effectively, both in verbal and written form, particularly with regard to technical material. One class session. 2 s.h. (w) STAFF

EE 173-174. *PROJECTS IN ELECTRICAL ENGINEERING.—A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of the Chairman of the Department must be obtained before registering. Elective for electrical majors. 3-6 s.h. (w) STAFF

EE 177. *ENERGY TRANSMISSION AND RADIATION.—A more advanced treatment of electromagnetic theory than is afforded by EE 109-110, with particular application to wave guides and antennas. Prerequisite: EE 110 and permission of instructor. Three class sessions. 3 s.h. (w) ARTLEY

EE 179. *ADVANCED ELECTRICAL MEASUREMENTS.—Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. (w) OWEN

EE 181-182. ELECTRONIC NETWORKS.—Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; micro-

wave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. (w) OWEN AND PILKINGTON

EE 183-184. ELECTRONICS LABORATORY.—Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. (w) CHAMBERS, FENG, AND OWEN

EE 191-192. ELECTRIC MACHINERY.—Application of circuit and field principles to underlying theory of static and rotating electrical machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. (w) MEIER AND WILSON

EE 193-194. ENERGY CONVERSION LABORATORY.—Selected experiments in energy conversion combining the theory and practice of transformers, electromechanical devices including motors and generators, photovoltaic sources, thermoelectric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 192-193. 2 s.h. (w) HALL, WILSON, AND YU

EE 199. *LINEAR FEEDBACK SYSTEMS.—Analysis and design of linear; continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: Permission of instructor. 3 s.h. JONES AND KOEPSEL

EE 201. ENERGY SYSTEMS.—Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units. (w) ARTLEY

EE 203, 204. INFORMATION SYSTEMS.—General concepts of information storage, transfer, and processing: information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: Permission of instructor. 6 units. (w) OWEN

EE 207. *NETWORK SYNTHESIS.—Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: Permission of instructor. 3 units. KOEPSEL, OWEN, AND VAIL

EE 211. SOLID STATE THEORY.—The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. (w) ARTLEY, BURGER, PILKINGTON, AND VAIL

EE 212. SOLID STATE MATERIALS.—Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units. (w) ARTLEY, BURGER, PILKINGTON, AND VAIL

EE 213. MAGNETICS.—A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units. (w) ARTLEY AND WILSON

* Offered only upon sufficient demand; enrollment limited.

EE 215, 216. SOLID-STATE DEVICES.—Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: Permission of instructor. 6 units. (w) BURGER AND PILKINGTON

EE 221. NONLINEAR ELECTROMAGNETICS.—Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. (w) WILSON

EE 222. NONLINEAR ANALYSIS.—Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. (w) WILSON

EE 231. *NUCLEAR ENGINEERING.—Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: Permission of instructor. 3 units. (w) MEIER

EE 241. *FEEDBACK CONTROL SYSTEMS.—Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; nonstationary and nonlinear systems. Prerequisite: Permission of instructor. 3 units.
KOEPSEL AND WILSON

EE 242. *OPTIMUM CONTROL SYSTEMS.—Use of variational methods in control system design: classical calculus of variations; dynamic programming; Pontriagin's maximum principle; quadratic and nonquadratic performance criteria; adaptive control systems; computer application in control. Prerequisite: Permission of instructor. 3 units. KOEPSEL

EE 243. *NONLINEAR CONTROL SYSTEMS.—Analysis and design of nonlinear feedback control systems; approximations for small and for large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. KOEPSEL AND WILSON

EE 259. *ADVANCED ELECTRIC ENERGY CONVERSION.—Equations of motion of electromechanical systems, fields and lumped parameters, state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: Permission of instructor. 3 units (w)
MEIER AND WILSON

The Department offers work leading to graduation with distinction. See the section on Honors.

## MECHANICAL ENGINEERING

PROFESSOR MACDUFF, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS KENYON AND MERIAM; ASSOCIATE PROFESSORS BOYLE AND ELSEVIER; ASSISTANT PROFESSORS BUZZARD, HARMAN, LEWIS, AND NASH; VISITING PROFESSOR CHURCH; VISITING LECTURER MIXON; MESSRS. ALEXANDER, BENGEL, BRESEE, BUROW, KENDRICK, AND TITUS

ME 52. KINEMATICS, KINETICS.—Analytical and numerical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for automatic machines, application of work,

energy, impulse and momentum. Prerequisite: Engrg 2, Phys 41. Concurrent: Math 63. 3 s.h. (w) MACDUFF

ME 59. MATERIALS AND PROCESSES.—Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: Sophomore standing. 3 s.h. (w) STAFF

ME 101-102. ENGINEERING THERMODYNAMICS.—A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisite: Chem 1, Phys 42. Concurrent: Math 64. 6 s.h. (w) KENYON

ME 103. THERMODYNAMICS.—A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapor; elements of combustion and heat transfer. Prerequisite: Chem 1, Phys 42. Concurrent: Math 64. 3 s.h. (w) MIXON

ME 105. DYNAMICS OF FLUIDS.—A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41, Math 63. 3 h.h. (w) KENYON

ME 106. HEAT TRANSFER.—A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 102, 105; Math 111. 3 s.h. (w) KENYON

ME 114. JUNIOR MECHANICAL ENGINEERING LABORATORY.—Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 101-102, ME 105, 106. 2 s.h. (w) STAFF

ME 116. MECHANICAL ENGINEERING LABORATORY.—Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamic properties of systems. Student planning of experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. (w) STAFF

ME 128. *DYNAMICS OF GASES.—The flow of compressible fluids at high velocities. One-dimensional compressible flow; area change; normal shock; friction and heat transfer; Mach number. Prerequisite: ME 102. Concurrent: ME 106. 3 s.h. (w) STAFF

ME 141. MACHINE DESIGN.—Methods of design of typical machine elements; strength and deflection requirements; simple shafts, springs, power transmitting devices, materials, and cost analysis. Prerequisite: Engrg. 107, ME 59. Concurrent: ME 52. 3 s.h. (w) NASH

ME 142. MACHINE DESIGN.—A continuation of ME 141. Analysis of gears and gear trains; lubrication; brakes and clutches; introduction to advanced topics. Prerequisite: ME 141. 3 s.h. (w) NASH

ME 153. *HEATING, AIR CONDITIONING, AND REFRIGERATION.—Principles of thermodynamics, heat transfer, and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression, absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. (w) HARMAN

ME 156. COMBUSTION ENGINES.—A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern developments. Prerequisite: ME 102. 3 s.h. (w) HARMAN

ME 157. *PUMPS, COMPRESSORS AND TURBINES.—An introduction to the

* Offered only upon sufficient demand; enrollment limited.

theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h. (w) BOYLE

ME 159-160. SENIOR MECHANICAL ENGINEERING LABORATORY.—Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. (w) STAFF

ME 162. POWER PLANTS.—Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. (w) HARMAN

ME 163. *VIBRATION CONTROL.—An introduction to the dynamics of mechanical systems; equilibrium, stability lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog stimulation. Prerequisite: Math 64. ME 141. 3 s.h. (w) CHURCH

ME 164. *ENGINEERING ANALYSIS.—A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretation of results. Concurrent: Math 64. 3 s.h. (w) BOYLE

ME 166. *AIR CONDITIONING DESIGN.—Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. (w) HARMAN

ME 167. INDUSTRIAL ENGINEERING.—A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: Senior standing. 3 s.h. (w) LEWIS

ME 168. *INDUSTRIAL ENGINEERING PRODUCTION METHODS.—Study of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: Senior standing, ME 167 or equivalent. 3 s.h. (w) LEWIS

ME 171. RESPONSE OF PHYSICAL SYSTEMS.—An introduction to the basic fundamentals of instrumentation and of the control of processes and systems with emphasis on correlation of analysis and experimental results. Prerequisite: Math 111. 3 s.h. (w) CHURCH AND MACDUFF

ME 173-174. MECHANICAL ENGINEERING SEMINAR.—A course designed to keep the students abreast of progress in the engineering field and to develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. (w) STAFF

ME 182. *FUNDAMENTALS OF NUCLEAR ENGINEERING.—Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope, utilizations, reactor systems and power reactors. Prerequisite: Permission of instructor. 3 s.h. (w) KENYON

ME 197-198. PROJECTS IN MECHANICAL ENGINEERING.—This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. (w) STAFF

ME 201. *THEORETICAL AND APPLIED MECHANICS.—Introduction to the theory of elasticity, vibration analysis, and hydrodynamics. This course is the same as CE 201. 3 units. CHURCH

ME 202. *THEORETICAL THERMODYNAMICS.—Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and

statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. HARMAN

ME 221. *ANALYSIS OF INCOMPRESSIBLE AND COMPRESSIBLE FLUID FLOW.—Flow of incompressible and compressible fluids; boundary layer phenomena for viscous fluids; Mach number concept for sonic and subsonic flow; experimental methods. 3 units. HARMAN

ME 222. *ANALYSIS OF HEAT TRANSFER.—Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses: steady and transient flow. 3 units. KENYON

ME 231-232. *SYSTEMS ENGINEERING.—Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. CHURCH AND MACDUFF

ME 280. *NUCLEAR REACTOR POWER CYCLES.—Introduction to basic reactor principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units. KENYON

The Department offers work leading to graduation with distinction. See the section on Honors.

## ENGINEERING SUBJECTS COMMON TO ALL CURRICULA

ENGRG 1. ENGINEERING GRAPHICS.—The study of elementary engineering graphics with emphasis on third angle projection, pictorial drawing, dimensioning, working drawings, pencil and ink techniques. 2 s.h. (w) HAINES, LEWIS, AND STAFF

ENGRG 2. DESCRIPTIVE GEOMETRY.—A study of drawing board geometry with emphasis on line and plane problems, developments, and intersections. Further emphasis on drawing techniques. Prerequisite: Engrg 1. 2 s.h. (w) HAINES, LEWIS, AND STAFF

ENGRG 57. STATICS.—A study of force systems equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisites: Engrg 1 and Phys 41; concurrent: Math 63. 3 s.h. (w) ARGES, WILLIAMS, AND WOOD

ENGRG 60. ENGINEERING MECHANICS.—A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using vector and scalar values. Concurrent: Phys. 42 and Math 63. 4 s.h. HARRAWOOD AND HILL

ENGRG 107. MECHANICS OF MATERIALS.—Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area—moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60; concurrent: Math 64. 3 s.h. (w) ARGES, PALMER, AND SHEPPARD

ENGRG 109. MECHANICS OF MATERIALS LABORATORY.—Study and use of testing machines and strain gages; tests to determine significant physical properties of the common engineering materials; experimental verification of the elementary theory of structural members. Must be preceded or accompanied by Engrg 107. 1 s.h. (w) ARGES AND SHEPPARD

ENGRG 115. DYNAMICS.—General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum, gyroscopic motion. Prerequisite: Engrg 57; concurrent: Math 64. 3 s.h. (w) HILL

ENGRG 128. FLUID MECHANICS.—Physical properties of fluids, fluid statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic

* Offered only upon sufficient demand; enrollment limited.

similarity, fluid flow in closed conduits and in open channels, fluid measurements. Prerequisites: Engrg 60. Engrg 115 or ME 52, Math 64. 3 s.h. (w)
HARRAWOOD, WILLIAMS, AND WOOD

ENGRG 153. *ARCHITECTURAL ENGINEERING.--The application of engineering principles to architecture; the influence of engineering function and trends on design; the interrelationship of engineering with architecture; the analysis of structural details and of processes of construction; field trips and inspection of construction projects. Prerequisite: Permission of instructor. 3 s.h. (w) HAINES

ENGRG 169. *LEGAL ASPECTS OF ENGINEERING.—A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real and personal property, torts, insurance, agency, equity, evidence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h. (w) OLIVE

ENGRG 170. *PATENT LAW FOR ENGINEERS.—A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h. (w) OLIVE

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# BULLETIN
OF
# DUKE UNIVERSITY




## The School of Nursing

ANNOUNCEMENTS 1964-65

VOLUME 36 April, 1964 NUMBER 6-A

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C. 27706

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N. C. 27706

For Bulletin of Engineering, apply to *The Registrar,* Duke University, Durham, N. C. 27706

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For Bulletin of The School of Nursing, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C. 27706

For Bulletin of The Summer Session, apply to *The Director of the Summer Session,* Duke University, Durham, N. C. 27706

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# BULLETIN

OF

# DUKE UNIVERSITY

## THE SCHOOL OF NURSING

1964-65

DURHAM, NORTH CAROLINA
1964

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# Calendar of the School of Nursing

1964

## THE SUMMER SESSION

| | |
|---|---|
| June 1 | Monday. Clinical courses for Summer term begin for pre-registered Junior and Special Students in School of Nursing. |
| June 9 | Tuesday. Registration for Summer Session courses. |
| June 10 | Wednesday. Instruction begins in all courses scheduled for first term of Summer Session. |
| June 20, July 4 | Saturdays. No Summer Session classes meet. |
| July 14, 15 | Tuesday, Wednesday. Examinations. |
| July 16 | Thursday. Registration for new students, second term of Summer Session courses. |
| July 17 | Friday. Instruction begins in all second term Summer Session courses. |
| July 25, August 15 | Saturdays. No Summer Session classes meet. |
| July 31 | Friday. Clinical courses end. |
| August 20, 21 | Thursday, Friday. Examinations. |

1964-1965

## FALL SEMESTER

| | |
|---|---|
| September 9 | Wednesday. Clinical courses for Juniors and Seniors begin. |
| September 17 | Thursday. 7:30 p.m. Orientation begins for all entering Freshmen and new students with advanced standing. |
| September 21 | Monday. Registration and matriculation of students who have not pre-registered. |
| September 24 | Thursday. Fall semester classes begin. |
| November 7 | Saturday. Last day for reporting six-weeks grades. |
| November 16-19 | Pre-registration for Spring Semester of 1965. |
| November 25 | Wednesday. 12:30 p.m. Thanksgiving recess begins. |
| November 30 | Monday. 8:00 a.m. Classes are resumed.* |
| December 11 | Friday. Founders' Day. |
| December 19 | Saturday. 12:30 p.m. Christmas recess begins. |

1965

| | |
|---|---|
| January 4 | Monday. 8:00 a.m. Classes are resumed.* |
| January 16 | Saturday. 12:30 p.m. Fall semester classes end. |
| January 19 | Tuesday. Final examinations begin. |
| January 29 | Friday. Final examinations end. |

## SPRING SEMESTER

| | |
|---|---|
| February 2 | Tuesday. Registration and matriculation of new students. |
| February 4 | Thursday. Spring semester classes begin. |

| | | |
|---|---|---|
| March | 17 | Wednesday. Last day for reporting six-weeks grades. |
| March | 27 | Saturday. 12:30 p.m. Spring recess begins. |
| April | 5 | Monday. 8:00 a.m. Classes are resumed.* |
| April | 12-16 | Pre-registration for Summer Session. |

* Nursing Laboratory sessions in Clinical Nursing Courses are resumed according to the normal schedule.

# Officers of the School for the Year 1964-65

## *General Administration*

Douglas Maitland Knight, Ph.D.
*President of the University*

Robert Taylor Cole, Ph.D
*Provost*

Gerhard Chester Henricksen, M.A., C.P.A.
*Vice President for Business and Finance*
*Treasurer*

Everett Harold Hopkins, LL.D.
*Vice President for Planning and*
*Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B.
*Vice President for Institutional Advancement and*
*Assistant Provost*

Charles Edward Jordan, A.B., LL.D.
*Vice President for University Relations*

Herbert James Herring, A.M., LL.D.
*Vice President for Student Life*

Frank Traver de Vyver, Ph.D.
*Vice Provost*

Harold Walter Lewis, Ph.D.
*Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D.
*Dean of the Medical School and Vice Provost*

Benjamin Edward Powell, Ph.D.
*Librarian*

Richard Lovejoy Tuthill, Ed.D.
*University Registrar*

Richard Lionel Predmore, D.M.L.
*Dean of the Graduate School of Arts and Sciences*

Craufurd David Goodwin, Ph.D.
*Secretary*

Edwin Constant Bryson, LL.B.
*University Counsel*

## *School of Nursing Administration*

| | |
|---|---|
| Ann Madeline Jacobansky, R.N., M.Ed.<br>*Dean of the School of Nursing* | 102 Faculty Apartments |
| (Mrs.) Edith P. Brocker, R.N., M.A.<br>*Assistant Dean of the School of Nursing*<br>*Director, Undergraduate Studies* | 1326 Welcome Circle |
| Capitola B. Mattingly, R.N., M.A., M.S.N.<br>*Director of Graduate Studies*<br>*Director, Graduate Medical and Surgical Nursing Program* | 904 Demerius Street |
| Emily B. Campbell, R.N., M.S.<br>*Director, Division of Fundamentals of Nursing* | 4503 Ryan Road |
| Rose J. Forgione, R.N., M.A.<br>*Director, Division of Maternal and Child Health Nursing* | H-12 Westover Apartments |
| (Mrs.) Ruth Harris, R.N., M.S.<br>*Director, Division of Medical-Surgical Nursing* | 1601 Sedgefield Street |
| Mary Jane Mordan, R.N., M.Ed.<br>*Assistant Director of Undergraduate Studies* | 2220 Elba Street |
| Betty Sue Johnson, R.N., M.S.<br>*Director, Division of Psychiatric Nursing* | 4503 Ryan Road |
| Richard Lovejoy Tuthill, Ed.D.<br>*University Registrar* | 2709 Dogwood Road |

## *Nursing School Council*

*Chairman:* Ann M. Jacobansky, Dean

*Assistant Dean:* Mrs. Edith Brocker

*School of Nursing:* Mrs. Ruth Harris, Miss Janet Campbell, Miss Rose Forgione, Miss Capitola Mattingly

*Professor of Nursing Service:* Miss Lelia Clark

*Department of Sociology:* Dr. Alan C. Kerckhoff

*Department of Psychology:* Dr. Irving Alexander

*Preclinical Department—School of Medicine:* Dr. David T. Smith

*Clinical Department—School of Medicine:* Dr. William J. A. DeMaria

*University Administration:* Dean Jane Philpott

*Ex-officio:* Vice-Provost Barnes Woodhall

# Instructional Staff

## *Faculty*

| | |
|---|---|
| Phoebe Ahlgren, R.N., M.S.<br>*Instructor in Nursing* | 101 Newell Street |
| Edith Perryman Brocker, R.N., M.A.<br>*Associate Professor of Nursing* | 1326 Welcome Circle |
| Elinor Caddell, R.N., M.S.N.<br>*Assistant Professor of Nursing* | 707 Louise Circle |
| Emily Campbell, R.N., M.S.<br>*Assistant Professor of Nursing* | 4503 Ryan Road |
| Janet Campbell, R.N., M.A.<br>*Assistant Professor of Nursing* | 4832 Brookhaven Road<br>Raleigh, N. C. |
| Lynn Collins, R.N., M.S.N.<br>*Instructor in Nursing* | 1309C Leon Street |
| Ollie Davenport, R.N., M.S.N.<br>*Instructor in Nursing* | 916 Lancaster Street |
| Rose Forgione, R.N., M.A.<br>*Assistant Professor of Nursing* | H-12 Westover Apartments |
| E. Gwendolyn Fortune, R.N., M.S.N.<br>*Associate Professor of Nursing* | |
| Virginia Gover, R.N., M.S.<br>*Assistant Professor of Nursing* | 2722 Brown Avenue |
| Ruth Harris, R.N., M.S.<br>*Assistant Professor of Nursing* | 1601 Sedgefield Street |
| Irma Lou Hirsch, R.N., M.S.N.<br>*Instructor in Nursing* | 1113 Wellons Drive |
| Clyde Hogsed, R.N., M.A.<br>*Assistant Professor of Nursing* | Box 91, Dogwood Acres<br>Chapel Hill, N. C. |
| Theresa Horton, R.N., M.Ed.<br>*Instructor in Nursing* | 810 Clarendon Street |
| Ann M. Jacobansky, R.N., M.Ed.<br>*Professor of Nursing* | 102 Faculty Apartments |
| Agnes Janoscrat, R.N., M.S.N.<br>*Instructor in Nursing* | Campus Apt. 15, Elf Street |
| Betty Sue Johnson, R.N., M.S.<br>*Assistant Professor of Nursing* | 4503 Ryan Road |
| Rosemary Lemmond, R.N., M.S.N.<br>*Instructor in Nursing* | 1605 Sedgefield Street |
| Ella McColl, R.N., M.S.<br>*Assistant Professor of Nursing* | 101 West Club Blvd. |
| Capitola B. Mattingly, R.N., M.S.N.<br>*Associate Professor of Nursing* | 904 Demerius Street |
| Wilma A. Minniear, R.N., M.S.N.<br>*Associate Professor of Nursing* | |
| Carol Mitcham, R.N., M.P.H.N.<br>*Instructor in Nursing* | 25 Rogerson Drive<br>Chapel Hill, N. C. |

| | |
|---|---|
| Mary Jane Mordan, R.N., M.S.N.<br>*Assistant Professor of Nursing* | 2220 Elba Street |
| Virginia Ritchie, R.N., M.S.<br>*Instructor in Nursing* | 3720 Kenmore Road |
| Marcia Black Stewart, R.N., M.S.N.<br>*Instructor in Nursing* | 875 Louise Circle<br>Apt. 43-C |
| Elizabeth Watling, R.N., M.A.<br>*Assistant Professor of Nursing* | 108½ Buchanan Blvd. |
| Ruby Wilson, R.N., M.S.N.<br>*Assistant Professor of Nursing* | 2109 Chapel Hill Blvd. |
| Helen Young, R.N., M.S.<br>*Assistant Professor of Nursing* | A3A University Apts. |

## INSTRUCTIONAL ASSISTANTS

Julia Jane Agner, R.N., B.S.N.
Grace Bullock, R.N., B.S.N.
Betty Mraz, R.N., B.S.N.
Jeannette Straub, R.N., B.S.N.
Patricia Paulson, R.N., B.S.N.
Ruth Proctor, R.N., B.S.N.

## PART TIME INSTRUCTIONAL STAFF

Beverly Ann Bowser, R.N., B.S.N.
*Instructional Assistant*
Lelia Clark, R.N., M.A.
*Director of Nursing Service*
*Professor of Nursing Service*
Katherine Couch, R.N., B.S.N.
*Instructional Assistant*
Carolyn Church, R.N., B.S.N.
*Instructional Assistant*
Charles Culver, Ph.D.
*Instructor*
Frances Dunham, Ph.D.
*Instructor*
Carol Hogue, R.N., M.S.N.
*Instructor in Nursing*
Helen McLachlan, M.A.
*Associate Professor of Dietetics*
Margaret Mitchell, R.N., M.Ed.
*Assistant Director of Nursing Service*

## HOUSE COUNSELOR

Dorothy Wilkinson, R.N.

## ASSISTANTS TO HOUSE COUNSELOR

Mrs. Nell Bratton
Sandra Scott, M.A.

## LIBRARIAN

Claudia Damschroeder

## DUKE HOSPITAL NURSING SERVICE ADMINISTRATION

Mary Jo Arena, R.N.
*Head Nurse, McDowell Ward*
*Jane Bailey, R.N., B.S.N.
*Supervisor, Surgical Nursing Service*
Barbara Bain, R.N., M.S.N.
*Supervisor, Clinical Research Unit*
Elizabeth Barbee, R.N., B.S.N.
*Head Nurse, Operating Room*
Geraldine Bodie, R.N., M.S.N.
*Supervisor, Medical Nursing Service*
Gretchen J. Cheek, R.N.
*Supervisor, Central Supply*
Mary Ann Clancey, R.N., B.S.N.
*Head Nurse, Halsted Ward*
Lelia R. Clark, R.N., M.A.
*Director of Nursing Service*
*Professor of Nursing Service*
Martha Covington, R.N., B.S.N.
*Head Nurse, I.N.U.*
Mary Davison, R.N.
*Head Nurse, Recovery Room*
Joanne Douglas, R.N.
*Head Nurse, Osler Ward*
Gertrude Elliott, R.N.
*Supervisor, Obstetric-Gynecology Nursing Service*
Marie M. Hensley, R.N., B.S.N.
*Head Nurse, Clinical Research Unit*
Pauline Hooks, R.N., B.S.N.
*Head Nurse, Sims-Williams Ward*
Sara Jeffreys, R.N.
*Supervisor, Surgical Nursing Service*
Vera Jennings, R.N.
*Head Nurse, Drake Ward*

* Educational Leave.

Betty Sue Johnson, R.N., M.S.
*Assistant Director of Nursing in Charge of Psychiatric Nursing*
Bess Jones, R.N.
*Head Nurse, Newborn Nurseries*
Lillian Mason, R.N.
*Head Nurse, Emergency Room*
Margaret McCotter, R.N.
*Head Nurse, Long Ward*
Pearlene McJunkin, R.N.
*Head Nurse, Central Supply*
Margaret E. Mitchell, R.N., M.S.
*Assistant Director of Nursing Service*
*Instructor in Nursing*
Evelyn Morgan, R.N., B.S.
*Head Nurse, Minot Ward*
Elinor Osborn, R.N., B.S.
*Supervisor, Out Patient Clinic*
Margaret Reece, R.N.
*Head Nurse, Operating Room*
Onzelle Riley, R.N.
*Head Nurse, Delivery Room*
Vivian Shaw, R.N.
*Head Nurse, Nott Ward*
Sharlene Spong, R.N.
*Head Nurse, Strudwick Ward*
Gloria Stevens, R.N.
*Head Nurse, Howland Ward*
Julia Suitt, R.N.
*Supervisor, Night Nursing Service*
Nancy Taylor, R.N.
*Head Nurse, Reed Ward*
Louise Thomas, R.N.
*Head Nurse, Operating Room*
Helen M. Tilley, R.N., B.S.N.
*Head Nurse, Cabell Ward*
Eleanora Torrence, R.N.
*Head Nurse, Matas Ward*
Beatrice Tyson, R.N.
*Supervisor, Evening Nursing Service*
Elsie M. Vaughan, R.N.
*Supervisor, Night Nursing Service*
Patricia Walsh, R.N.
*Head Nurse, Cushing Ward*
Margaret Watson, R.N.
*Supervisor, Operating Room*
Myrtle Whitaker, R.N.
*Head Nurse, Hanes Ward*
Margaret Williamson, R.N.
*Instructor, LPN Program*
Ora Lee Winston, R.N.
*Head Nurse, Holmes Ward*
Clara Wright, R.N.
*Supervisor, Evening Nursing Service*
Helen Yoho, R.N.
*Instructor, LPN Program*

## *Staff*

L. Margaret Lawrence
*Secretary to the Dean*
Lillian Bobbitt
*Clerk Typist (Part time)*
Virginia Hall
*Clerk Typist*
Mildred H. McGhee
*Clerk Typist*
Dorothy Moye
*Clerk Typist*
Wilhelmena Webb
*Clerk Typist (Part Time)*
Esther M. Weller
*Recorder*
Lorene Williford
*Clerk Typist*

## *School of Nursing Committees*

### EXECUTIVE COMMITTEE

*Chairman:* Dean Ann M. Jacobansky

*Director, Graduate Studies:* Capitola B. Mattingly

*Director, Undergraduate Studies:* Mrs. Edith Brocker

*Faculty:* Rose Forgione, Mrs. Ruth Harris

### UNDERGRADUATE

*Admissions Committee:* E. McColl, *Chairman,* M. J. Mordan, H. Young, D. Wilkinson, O. Davenport, L. Collins, E. Weller, *Secretary*

*Curriculum Committee:* E. Brocker, *Chairman,* R. Forgione, M. J. Mordan, R. Harris, E. Campbell, C. Mattingly

*Student Promotions and Student Welfare Committee:* E. Brocker, *Chairman,* V. Gover, I. L. Hirsch, Dr. C. Culver, O. Davenport

### GRADUATE

*Curriculum Committee:* C. Mattingly, *Chairman,* E. Brocker, R. Harris, M. J. Mordan

# General Information

The School of Nursing functions within the philosophy of Duke University. This philosophy is epitomized by its motto, *Eruditio et Religio,* which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities."

The faculty of the School of Nursing ascribes to the concept that a professional nurse is a person who has acquired the specialized knowledge of Nursing, who has attained abilities useful in practice of Nursing, and who has developed attitudes appropriate to the profession of Nursing.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of the students through experiences planned for the acquisition of specific knowledges which include: knowledge of scientific principles basic to Nursing, and knowledge of the tools, techniques, and resources useful in the practice of Nursing, and knowledge of characteristics of the Health and Welfare Institutions.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of the students through experiences planned for the attainment of skills which include: the ability to make decisions independently or as group participants, the ability to relate separate phases of patient care to a total plan of patient care, the ability to observe specifics, and to interpret observations for self and others; the ability to work harmoniously and positively with people in ramified and complex situations and organizations.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of students through experiences planned for the development of desirable attitudes which include: a concern for personal enrichment, an appreciation of and respect for individuality, an awareness of their role as citizens, for contributing to their own development and to that of their community and profession.

## *History*

The School of Nursing of Duke University was established in association with the School of Medicine and Duke Hospital. The first class of students was admitted in January 1931. In 1953, the School of Nursing was incorporated into the Division of Health Affairs in the University structure. When established, the three year curriculum leading to the Diploma in Nursing was planned to prepare young women to meet community nursing needs; students who completed two years of acceptable college work were awarded a Bachelor of Science degree in Nursing in addition to the Diploma in Nursing. Trends in nursing created a demand for a four year program leading to the degree of Bachelor of Science in Nursing, and in 1953, the University Board of Trustees approved such a program. The Master of Science in Nursing degree was authorized in 1956.

Graduates of Duke University School of Nursing have served their communities in North Carolina and in other states; they have participated in their professional organizations on a national, state and local level. During World War II graduates of this school staffed the 65th General Hospital, the Duke University Medical Unit.

## *Relationship to the University*

As a part of the University community, the School of Nursing serves its students as the focus of a total educational experience that only a major university can provide. It shares the same campus with Trinity College, College of Engineering, the Graduate School of Arts and Sciences, the Divinity School and the Schools of Law, Medicine and Forestry, and Duke Medical Center. The facilities for library, laboratory and field work and the many activities—religious, intellectual, cultural and athletic—form part of the environment which contributes to the development of students in nursing. Thus, the student in nursing may enjoy simultaneously the broad facilities and challenges of a University and the life and atmosphere of a professional school.

## *Membership and Accreditation*

Duke University, which incorporates the School of Nursing with all of the other schools of the University, is a member of the Association of American Colleges and is accredited by the Southern Association of Colleges and Secondary Schools.

The generic program leading to the degree Bachelor of Science in Nursing is accredited by the National League for Nursing and the

North Carolina Board of Nurse Registration and Nursing Education.

The School is a member of the Department of Baccalaureate and Higher Degree Programs of the National League for Nursing.

## *Facilities*

The facilities for instruction include the facilities available in the undergraduate, professional, and graduate schools and colleges of Duke University and the clinical facilities of Duke Hospital, the North Carolina Cerebral Palsy Hospital and the Durham Health Department.

In a wing of Hanes House are located the administrative offices of the School of Nursing, a large classroom seating 100 persons and equipped with audio-visual aids; a small classroom seating 50 persons and equipped with a screen and movie projector, a nursing arts laboratory with equipment for nursing practice for sixteen students, and conference room.

A reference library of 6,000 books and periodicals of special interest to students majoring in nursing is located in Hanes House. Students use the general and professional libraries of the University.

Duke Hospital, an integral part of the Medical Center, is a 627-bed, 30 bassinet general hospital which performs the concurrent functions of patient care and professional education. It admits over 20,000 patients a year, and maintains comprehensive diagnostic and treatment facilities for their care.

Different levels of patient care are provided by a minimal care unit and intensive care facilities in addition to conventional nursing units. Private, semi-private, and ward accommodations are available. Approximate daily patient census by service is as follows: Surgery (including Urology, Otolaryngology, Ophthalmology, and Orthopaedics), 230; Medicine (including Dermatology and Neurology), 150; Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include 18 operating rooms and a recovery room; over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained.

Outpatient services include a public clinic which totals some 121,000 visits a year, a private diagnostic clinic of comparable size and an active emergency service. All of the hospital components are located within a single building. Close working relationships between Duke Hospital and outside health agencies contribute to continued care.

Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association, and conducts an active educational program involving some 280 house staff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

## *The Summer Session*

The programs in the School of Nursing include courses in the Summer Session each year. Students in the School of Nursing have their courses approved in the School of Nursing and pre-register with the Summer Session office. Students from other colleges and universities who are admitted to the School of Nursing with advanced standing may be required to enroll in the Summer Session to make up deficiencies. Arrangements for registration are made through the office of the Dean of the School of Nursing.

The Summer Session of 1964 will include two terms: Term I, June 9 to July 15; Term II, July 17 to August 21. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program both athletic and social.

University fees for Summer Session 1964 will be charged at the rate of $35.00 per semester hour for those admitted with advanced standing. Board for resident students is charged at the rate of $75.00 for each term of Summer Session, room is $46.50 per person for a term of Summer Session. The cost of laundry is approximately $0.50 per week. A bill is sent to all pre-registered students to permit payment in advance.

## *Medical Care*

Students enrolled in a regular program of studies are eligible for the services offered under the health program of the school.

Complete medical facilities are available to students at the Duke Medical Center under the health program. With the necessary exceptions noted below, this type of care is furnished at a minimum expense to regularly enrolled students. The cost is included in the general fee paid each semester.

1. Physical Examination: Upon admission each student receives a complete physical examination including a chest x-ray. Thereafter, the physical examination is repeated annually; the chest x-ray semi-annually.

2. Health Office: The health office in Hanes House, under the direction of a physician is maintained for the students in the school. Advice, treatment and examination are available to students during regular hours. Consultation with Duke Medical Center staff special-

ists are arranged through the health office if necessary; drugs, dressings, laboratory tests and x-rays are arranged for as needed.

3. Hospitalization: A student requiring hospitalization is admitted to Duke Hospital. Admission is arranged through the health office. Medical and surgical care is under the supervision of a senior physician or surgeon. Hospital care includes staff nursing, drugs, dressings, laboratory tests and x-rays as needed. Hospital care is limited to thirty days.

If the student is covered by an insurance plan which provides for hospitalization, medical or surgical benefits, the coverage shall be applied to the cost of her care.

4. Exceptions: The health program does not cover private duty nursing, refraction of eyes, treatment of teeth, all chronic or pre-existing conditions such a diseased tonsils, hernias, pilonidal cysts, chronic skin conditions, endocrine disturbances; elective surgery, braces or any orthopaedic appliances; accidents or illness occurring during vacations or while off the campus. Blood used for transfusions must be paid for or replaced.

5. Psychiatric Consultation: Advisory consultation with a psychiatrist can be arranged through the Dean of the School of Nursing at no expense to the student. Further psychotherapeutic interviews are not included in the program.

6. Student Health Insurance: This may be secured through the University at a minimal rate. The insurance excludes any coverage for accident or illness cared for under the health program; insurance protection is furnished for off the campus and during vacations.

## PROFESSIONAL, SOCIAL AND CULTURAL ORGANIZATIONS

The scope of student organized activities fall into many broad interest areas, such as student government, service, professional, and honorary, publications and radio, music, drama and social.

Three magazines and a comprehensive yearbook are published by students. Student publications are under the control of the Publications Board, composed of members from the University staff appointed by the President; men from the Junior and Senior classes, elected by the students in Trinity College and the College of Engineering; women from the Junior and Senior classes, elected by the students in the Woman's College; and women elected from the Junior and Senior classes, elected by the students in the School of Nursing; and editors and managers of student publications, *ex officio* members without voting power. No student publication can be established at the University without the approval of the Board.

The musical groups include the Chapel Choir, Symphony Orchestra, Concert Band, Glee Clubs, and several smaller groups. The Duke Players present a number of plays and readings each season. The

Hoof 'n' Horn Club annually produces a musical comedy which is written, cast, directed, and acted by students from the three colleges.

Other campus groups, social in nature, sponsor dances, chaperoned cabin parties, concerts, and informal discussion groups. Social functions are frequent enough to afford the relaxation needed from work required in class room and laboratory.

The Union Building, located on the West Campus, is the student center for coeducational activities. It houses, among other groups, the Student Union organization. This body is unique in its coeducational aspects, bringing the men and women together in the carrying out of its stated purpose, "to stimulate, promote, and develop the social, recreational, cultural, educational, and spiritual activities of the students of Duke University." This purpose is carried out through a broad program including lectures, concerts, recreational activities, dances, exhibits, etc., adapted to the leisure time interests and needs of all students, who as undergraduate students are members of the Union.

## *Religious Life*

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and five denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's re-

ligious life are offered in organ and carillon recitals, choral concerts, other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

## *Student Government Association*

The purpose of this organization is to regulate all matters pertaining to the life of the undergraduate women of Duke University School of Nursing not under the jurisdiction of the faculty; to increase a sense of individual responsibility; and to cooperate with the faculty in creating and maintaining high ideals for the Duke University School of Nursing. Each student is a member of this Association from the time of her entrance into the School of Nursing until her graduation. An Executive Council, consisting of fifteen elected members, coordinates the affairs of this Association, but the student body as a whole is responsible for all legislative action.

THE HONOR SYSTEM: The purpose of the Honor System is to secure the cooperation of the undergraduate student body in maintaining honorable conduct in all relations of student, professional and social life. It applies to every undergraduate student in the School of Nursing. The Honor System is a vital directive force in all phases of each student's life and is a major working part of the Student Government Association.

## *Santa Filomena*

SANTA FILOMENA is the Senior honorary society of Duke University School of Nursing. Its purpose is to recognize achievement and promote leadership. New members are publicly tapped at the May meeting of SGA. They are selected from the rising Senior class, and must fulfill the following three requirements:

1. Maintain a superior average throughout their first two years.
2. Demonstrate superior nursing ability.
3. Make some contribution to the betterment of the School of Nursing.

Santa Filomena strives to serve the nursing profession. Because all proceedings and ceremonies except tapping are secret, it may serve nursing in ways that other organizations cannot.

Santa Filomena's color is white; its flower, a white carnation; its pin, a small gold Florence Nightingale lamp.

## *The North Carolina State Student Nurses Association*

As members of the Duke University School of Nursing, students are eligible for membership in the North Carolina State Student Nurses Association and the American Student Nurses Association.

# Undergraduate Program of Study

# Undergraduate Program of Study

## *Admission Requirements*

NEW students are admitted for the academic year at the opening of school in the fall.

Candidates may qualify for admission as members of the freshman class or as students with advanced standing. Since the enrollment is limited, the Committee on Admissions selects students who, in its judgment, are best qualified to benefit from the educational advantages which the school offers. Selection is based on the academic record of the candidate, on test scores, and on satisfactory evidence of good character and general fitness for college life at Duke. A visit to the campus for a personal interview with members of the faculty is of material benefit to the candidate and to the Committee.

ADMISSION TO THE FRESHMAN CLASS: A candidate for admission to the freshman class must present at least fifteen acceptable units of secondary school credit. A minimum of twelve units must be in college preparatory subjects, but it is recommended that fifteen be offered. Subjects classified as college preparatory are English, foreign language, history and social studies, mathematics (Algebra and Geometry), and sciences.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

EARLY DECISION PLAN: For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on October 15 of the student's senior year in secondary school. The deadline date for completing

applications for October decision is September 15. Interested students should write to the Office of Admissions for detailed information.

REGULAR ADMISSION: Candidates for regular admission must apply no later than March 1, and normally do so during the fall of the senior year. For this group, decisions are mailed by May 1.

Candidates for admission to the School of Nursing should address their inquiries to the Dean of the School of Nursing, Hanes House, Duke University, Durham, N. C., 27706.

A candidate for admission who wishes to arrange an interview should do so through the Office of Admissions of the School of Nursing.

## *Specific Requirements for Admission*

I. All applicants for admission to the School of Nursing must present at least fifteen acceptable units of secondary school credit. A unit of credit is allowed for a course of study pursued throughout an academic year at an accredited secondary school, if the course has been completed satisfactorily.

1. Twelve units must be in English, foreign language, history and social studies, mathematics, and natural science; and must include:
   (a) English—3 units.
   (b) Algebra—1 unit.
   (c) Plane geometry—1 unit.
   (d) Chemistry—1 unit.
2. The three remaining units are elective and may be selected from those subjects for which the school allows credit toward graduations; but they should also be selected from the five subject fields listed above.

Other units offered in subjects not included in this list will be considered for acceptance on the basis of full statements transmitted with the applicant's record from the school recommending her.

II. Applicants are advised to have their scores on the Scholastic Aptitude Tests and the scores on three achievement tests of the College Entrance Examination Board submitted to the office of Admissions of the School of Nursing.

III. All applicants must supply references from at least three persons, two of whom must be recent high school or college instructors.

IV. Interviews with members of the Duke University School of Nursing faculty are desirable and are encouraged.

V. Evidence of good health will be requested after the applicant is considered for acceptance. Final acceptance will be contingent on a

complete physical examination during the week of Orientation. This examination also includes a chest x-ray, blood and urine studies and skin tests.

## *Admission to Advanced Standing*

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions of the School of Nursing.

Applicants for advanced standing in the School of Nursing should present, as far as possible, subjects corresponding to those required by the School. They may not, during their first semester, register for more than the minimum number of hours required of the class which they enter, except by permission of the Dean of the School of Nursing.

Graduate nurses applying for admission to advanced standing are required to submit records of previous performance in Nursing, scores on the Scholastic Aptitude Tests and three Achievement Tests.

TRANSFER CREDITS. Transfer credit, in which grades of C or above have been earned, is rated at two quality points per semester hour. Courses in which grades of less than C have been earned are not acceptable for credit.

Although credit for work completed at other institutions will be determined in relation to the curriculum requirements of the School of Nursing, an overall average grade of C on all previous work taken is required before consideration for advanced standing may be given.

A student who transfers with advanced standing to the School of Nursing from a junior college must be enrolled for at least one semester before transfer of credit will be accepted. Credit for courses in science offered for advanced standing by a transfer from a junior college will be determined by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses. Any extension work accepted must be approved by the dean.

SPECIAL STUDENTS: Graduate nurses may be admitted for special work in such courses of instruction as their earlier training and experience may qualify them to take. They may not be admitted as candidates for a degree in the regular course of study unless they are able to meet all normal requirements for admission, which apply to all beginning students.

READMISSION OF FORMER STUDENTS: Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Duke University School of Nursing Office of Admissions with a detailed account of their activities since withdrawal from college.

# Financial Information and Living Accommodations for Undergraduate Students

FEES PAID by students cover only a part of the cost of their instruction and of the operation of the University. Income from endowment and contributions from the alumni, alumnae, and other public spirited men and women meet the balance, which constitutes more than half the total cost.

## *Estimated Expenses*

| | 1st year (2 sems) | 1st year (summer session) | 2nd year (12 mths.) | 3rd year (12 mths.) | 4th year (2 sems) |
|---|---|---|---|---|---|
| Tuition | $ 1050.00 | | $1050.00 | $1050.00 | $1050.00 |
| General Fee | 187.00 | | 187.00 | 187.00 | 187.00 |
| Room Rent | 285.00 | $46.50 | 395.00 | 395.00 | 285.00 |
| Board | 450.00 | 75.00 | 600.00 | 600.00 | 450.00 |
| Laundry (approx.) | 20.00 | 3.00 | 25.00 | 25.00 | 20.00 |
| Books (approx.) | 40.00 | 10.00 | 40.00 | 40.00 | 10.00 |
| Activities (Student Government) | 15.00 | | 15.00 | 15.00 | 15.00 |
| Uniforms (approx.) | 90.00 | | 10.00 | | 10.00 |
| Room Key Deposit. | 1.00 | | | | |
| Travel | | | | | 15.00 |
| Locker Rental | | | 1.00 | 1.00 | 1.00 |
| | $2138.00 | $134.50 | $2323.00 | $2313.00 | $2043.00 |

The tuition of $525.00 and the general fee of $93.50 are due and payable not later than the date of the beginning of a particular semester. No refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Beginning the third year, qualified students may secure additional supervised training by performing services during hospital assignments in patient care. Such students receive awards commensurate with service performed.

New students, on notification of acceptance, are required to pay a non-refundable matriculation fee of $20.00 and to make a deposit of $50.00. The $50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, $25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining $25.00 as a continuing registra-

tion deposit. Arrangements for refund for $25.00 room deposit are described in information furnished each resident student by the Housing Bureau. The $25.00 registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

Students who have been re-admitted to the University after an absence of one or more terms on notification of re-admission, are required to make the $50.00 room rent and registration deposit.

Undergraduate students are required to live in the School of Nursing residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for a period of not less than one semester. No refund of room rent will be made to a student who withdraws from the residence halls.

The dining facilities available to students in the School of Nursing include the Medical Center Hospital Cafeteria for upperclass students; the Men's Graduate Center Cafeteria and the East Campus Union for freshman and sophomore students. Resident students may not board at other than the places specified. The charge for board is payable in equal payments, not later than the date of the beginning of each semester and for freshmen, also at the beginning of summer session.

Students will not be entitled to a refund on board after the dates indicated below. For freshman and sophomore students, no refund on board will be made after the Fall or Spring mid-semester. For junior and senior students, no refund on board will be made after the fall clinical quarter or after the winter clinical quarter.

In the regular academic year, students who register for no more than two courses with a maximum credit of 8 semester hours are classified as special students. They are charged a registration fee of $5.00 for each course and $35.00 for each semester hour of course credit. Registration for 9 or more semester hours or 3 or more courses, requires payment of full fees.

Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than 8 semester hours may audit other courses by payment of $15.00 for each course audited. Auditors submit no daily work, take no examinations, and receive no credit for courses audited.

One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

No records are released and no student is considered by the faculty

as a candidate for graduation until she has settled with the Treasurer for all indebtedness.

Bills may be sent to parents or guardians provided the Treasurer has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

## *Living Accommodations*

Hanes House and Hanes House Annex are residence houses for School of Nursing students. Freshman students are assigned to Hanes House Annex. A counselor and her assistants, who are members of the Dean's staff, live in the respective houses. The counselors, with the cooperation of the Student Government Executive Council, are responsible for the administration of the houses.

Undergraduate students are required to live in the residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for the academic or calendar year, but for a period of not less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

The rental charge for a single room is $335.00 for an academic year or $167.50 per semester or $465.00 per twelve month period. The rental charge for a double room is $570.00 for an academic year or $142.50 per person per semester, or $790.00 per twelve month period or $395.00 per person for twelve months period. The rental charge for a single room for a summer session term is $55.50; the rental charge for a double room for a summer session term is $93.00 or $46.50 per person.

Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students making application for housing. Occupants are expected to abide by these regulations.

Room reservations are made with the Housing Bureau. An applicant who has been officially accepted as a resident student is assigned a room according to an established plan. The initial $25.00 room deposit is effective for the entire college course of the student whose attendance during regular terms is continuous. The deposit will be refunded to resident students under the following conditions: (a) within thirty (30) days after the student has been graduated, (b) upon student's withdrawal from the University residence halls provided a written notice is received in the Housing Bureau by August 1 for cancellation of reservation for the fall semester and not later than January 15 for cancellation of reservation for the spring semester, (c) when the reasons requiring withdrawal are beyond the student's con-

trol. No refund is made until the occupant has checked out of her room through the Housing Bureau and has settled all her accounts with the Bursar.

Freshman students are assigned to Hanes House Annex. The Housing Bureau with the assistance of the Orientation Committee selects a roommate for a new student who is assigned to a double room but has made no arrangement for a roommate. After a student has been in residence for one semester, she is responsible for obtaining and keeping a roommate if she continues to occupy a double room. If a student occupying a double room does not obtain a roommate within a period of seven (7) days after written notice has been sent from the Housing Bureau, she may be required to pay the rental consideration for the whole room.

After a student has engaged a room she is not permitted to move to another without the consent of the Housing Bureau. A student leaving one room and occupying another without permission may be charged for both rooms for the entire semester. No student is allowed to rent or sublet her room to another occupant.

Residence hall rooms are reserved by upperclass students in accordance with the plan that is published during the school year. All rooms that have not been reserved on or before the announced date will be considered vacant for the succeeding semester and will be assigned to others.

The rooms are equipped with only the principal articles of furniture. Each student provides her own linens, blankets, bedspreads, and curtains. She may supply additional articles, but large rugs and additional furniture which make cleaning difficult are prohibited.

## *Scholarships, Loans, Grants-in-Aid*

SCHOLARSHIPS: Scholarships intended to recognize outstanding students are awarded annually to candidates who evidence qualities which give high promise of excellence in Nursing.

Candidates for competitive scholarship prizes should initiate applications during the fall semester of the senior year of study in secondary school. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for these awards.

All candidates for scholarships are required to take the Scholastic Aptitude Test and three Achievement Tests; English Composition is required as one of the three Achievement Tests of the College Entrance Examination Board in order to qualify for consideration by the

Scholarship Committee. The test must be taken either in December or January prior to the September in which admission is sought.

AWARDS: A maximum of eleven scholarships will be awarded annually without reference to geographical area.

ELIGIBILITY: Any student who has been accepted for enrollment by February 15 to the freshman class of the Duke University School of Nursing in the ensuing academic year is eligible to compete for a scholarship award.

OBJECTIVE: These awards are scholarships based on merit. They are intended to encourage young women who give promise of becoming leaders in the field of nursing. Financial need is not a factor in making the awards. The size of the stipend assigned to each winner, however, will vary to some extent with the financial circumstances of the recipient. The honorary stipend for students needing no assistance will be $200.00 annually, while the stipend may be as large as $1200.00 for the students who need maximum aid.

BASIS OF AWARDS: The Scholarships will be awarded on the following basis:

1. Secondary school scholastic record (candidates will be restricted to the highest quarter of their classes).
2. College aptitude as shown by tests, particularly the Scholastic Aptitude Test and the Achievement Tests of the College Entrance Examination Board.
3. Breadth of interests and native ability as indicated by extracurricular activities.
4. Participation in church, civic, and other organizations with particular reference to the demonstration of qualities of leadership.

DURATION OF AWARD: The award will be made for one year renewable for a second year on the condition that the holder maintain a scholastic average in the top quarter of her class or a "B" average, and further that she show evidence of developing the qualities of leadership which served as the basis for the original selection. The maximum duration of the award will be two years.

METHOD OF SELECTION: A scholarship Committee of Duke University faculty members will select the winners and alternates on the basis of the applications submitted. All applicants will be notified of their eligibility for competition by May 15, 1965.

PROCEDURE: All candidates for Duke University School of Nursing Scholarships and grants-in-aid who wish to be considered for awards on the basis of their financial circumstances are required to complete the Parents' Confidential Statement of the college scholarship service. This statement may ordinarily be obtained from the

high school guidance counselor or principal. Application for scholarship must be submitted by February 1 to the Office of Admissions, Duke University School of Nursing, Durham, North Carolina.

GRANTS-IN-AID: Although sufficient funds are not available to assist all applicants who present requests for aid, a number of grants-in-aid are made each year to able students who need financial assistance in order to meet the cost of attending college. Any candidate for admission, therefore, who considers herself to be in such need is eligible to apply for a grants-in-aid.

Applicants for grants-in-aid will be required to submit a detailed statement of financial resources.

The following scholarship fund is available to nursing students who apply for grants-in-aid.

FLORENCE K. WILSON SCHOLARSHIP FUND

Established in 1961 by combining the Nurses' Alumnae Association Scholarship Fund, the students' Florence K. Wilson Scholarship Fund and contributions from the Wilson family and friends; the income to be used for scholarships for students enrolled in the School of Nursing.

REMISSIONS OF TUITION: Certain students attending Duke University are entitled to a remission of the University tuition charge. Students in this group are entitled to a maximum of eight semesters of free tuition at the undergraduate level. Each Summer Session in which work is taken and each semester spent in another institution will be counted as one of the eight allowable semesters. Only those students enrolled in the regular Nursing School program leading to a Bachelor of Science degree in Nursing are entitled to a remission of tuition charge.

Children of ministers who are members of the North Carolina or Western North Carolina Conferences of the Methodist Church are entitled to a remission of the University Tuition charge, as are the children of ministers of all faiths residing in Durham County, North Carolina. This consideration is given only to children of resident members of the two North Carolina conferences who are giving their full time to religious work.

TUITION GRANTS: Tuition grants are given to the children, step-children, and adopted children of certain qualified staff members of Duke University.

LOANS: Since the attainment of college education, like the purchase of a home, is an expensive undertaking students may find it necessary to borrow a portion of the funds required. Duke University has student loan funds available which supplement the program of scholarships and grants-in-aid. All candidates for loans must make a minimum grade of "C" in the semester preceding their appli-

cation for a loan. Freshmen, therefore, will ordinarily be recommended by the University Scholarship Committee for a student loan which will not exceed the amount of tuition for the second semester.

Loans are granted from the Joseph F. Stein Student Loan Fund by the University Loan Committee upon the recommendation of the Dean of the School of Nursing. This fund was established to provide a means of assistance to students to meet pressing financial problems. The amounts to be loaned are limited in size and will not be charged interest rates if paid prior to termination of the program or if the student completes her program. Should a student, with an outstanding loan, withdraw from the school before she has completed her program, interest will accrue at 3% per annum for the first five years; 6% per annum after 3% ceases to be effective. Monthly payments shall be made on the first day of the next following October and continuing on the first day of each month thereafter of at least two per cent of the amount of the principal balance on the June 30th next prior to the date on which the first such monthly payment becomes due.

## *Army and Navy Nurse Corps Student Program*

Students in the Basic Nursing Programs may apply for appointments in the Army Student Nurse Program at the beginning of their Junior year, or the Navy Nurse Corps Candidate Program at the beginning of their Senior year. The appointments carry generous financial allowance. A student who participates twelve months or less serves on active duty in the respective service for 24 months. If 2 years support has been given, she serves 36 months.

Graduate Nurse Students enrolled in the Undergraduate Program may apply for the same appointment in the Army Student Nurse Program if they have completed their diploma program within the past 30 months and are able to complete the requirements for their degree within 24 months.

These opportunities are open only to students enrolled in programs accredited by the National League for Nursing.

# General Regulations Undergraduate Students

## *Orientation Program*

ALL FRESHMEN and transfer students are required to participate in the activities of Orientation Week. The program includes placement tests, orientation lectures, physical examinations, social events, special religious services, registration, and enrollment. New students who miss the whole or a part of the Orientation Program place themselves at a serious disadvantage at the very outset of their college career.

## *Registration*

Students who register in either semester at a date later than that prescribed must pay to the Treasurer a fee of $5.00. Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

## *Health Regulations*

Before admission to the School of Nursing, a student is required to have a physical examination by the family physician and to be immunized against typhoid fever, diphtheria, tetanus, smallpox and poliomyelitis. Physical defects, such as defective vision, dental needs, etc., must be corrected before admission.

Before final acceptance, each student is required to undergo a physical examination under the School's direction during Orientation. Students whose condition needs further observation may be admitted tentatively, but must cancel their applications if findings prove them physically unable to pursue the program.

## *General Academic Regulations*

QUANTITY CREDIT AND COURSE LOAD: The term of credit used is the semester hour which signifies one class period a week throughout the semester. Two or four hours of laboratory work are equivalent to one hour of class work. Two semesters of seventeen weeks each or three quarters of twelve weeks each constitute the aca-

demic year. For the degree of Bachelor of Science in Nursing, credit for 135 semester hours is required.

The normal load of a student is four or five academic and professional courses totaling 15 to 19 semester hours per semester during the freshman and sophomore year or 6 to 9 semester hours per quarter during the junior and senior years, exclusive of physical education. No student is permitted to take less than 14 semester hours of work per semester during the freshman and sophomore years or 6 semester hours per quarter during the junior and senior years or more than the normal load during any part of her program without special permission from the dean.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are determined by grades as follows: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points. Credit for at least 270 quality points is required for the degree of Bachelor of Science in Nursing.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION FROM COLLEGE: To continue in college and to graduate, students must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours, achieve a specified quality point ratio, and in the case of graduation earn a minimum number of quality points. The quality point ratio is calculated by dividing the accumulated number of quality points earned by the accumulated number of semester hours carried (not semester hours passed). These requirements are listed in the following table.

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 24 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 56 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 80 s.h. credit and a q.p.r. of 1.75 |
| The fourth to the fifth year, if needed | 114 s.h. credit and a q.p.r. of 1.85 |

For graduation the minimum requirement is 135 semester hours, 270 quality points and a quality point ratio of 1.9.

In addition to the qualitative standards listed above students must pass a minimum number of hours each semester. Freshmen must pass at least 6 semester hours of work in their first semester and 18 semester hours in their first year exclusive of physical education; all other students in their freshman and sophomore years must pass at least 9 semester hours each semester. Junior and senior students are expected to maintain a "C average" in nursing. The University may require a

student whose record is considered unsatisfactory to withdraw, although she has met the minimum requirements set forth in this paragraph. Any student whose standing in the School of Nursing indicates that she is performing below an acceptable level (minimum requirements) in either her academic or clinical courses, will be (after careful evaluation by the faculty) placed on probation. Both the student and her parents will be appropriately notified of this action.

Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semester. In addition, reports on freshmen are mailed at each mid-semester period.

CLASS STANDING: Students to rank as sophomores must have to their credit at least 26 semester hours and 52 quality points; and must have passed certain designated courses relating to their major; as juniors, at least 56 semester hours and 112 quality points and must have passed those courses relating to and including the nursing major; and as seniors, at least 90 semester hours and a quality point ratio of 1.75 and must have passed those courses relating to and including the nursing major.

### ACADEMIC HONORS

To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load. All semester hours on which a student receives a grade are counted in the determination of Class Honors. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio are eligible for Class Honors.

The degree of Bachelor of Science in Nursing with distinction is conferred in accordance with the following rules:

To be eligible for consideration for general Honors at graduation a student must have completed in residence a minimum of ninety semester hours. Students who earn an average of at least a quality point ratio of 3.50 are recommended for a degree magna cum laude. Those who earn a quality point ratio of 3.75 are recommended for a degree summa cum laude.

## *Awards to Undergraduate Students*

THE FLORENCE NIGHTINGALE PLAQUE: The Florence Nightingale plaque is awarded to a graduating student by the Alumnae Association for leadership, scholarship and nursing skill.

THE MOSELEY AWARD: The Moseley Award of $25.00 is given to the student in the senior class who has shown the most skill in Nursing Arts throughout her program in the School of Nursing.

## RESIDENCE REQUIREMENTS

A minimum of 60 semester hours of senior-level work in the School of Nursing or in the colleges of arts and sciences must be earned in residence. Students who meet this requirement but who still lack 6 or 8 semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the head of the department concerned and by the Dean.

Students who complete in a summer session the work required by the University for the degree will be granted the degree at the end of the summer.

## GRADING AND EXAMINATIONS

Grading: Grades are reported to indicate the following:

(1) Passed. A, B, C, and D are all passing grades. The letters are intended to indicate the following quality of work. A, exceptional; B, superior; C, medium; D, passing.
(2) Failed. A grade of F indicated that the student has failed the course, and in order to receive credit for the course she must repeat the work in class.
(3) Incomplete. (a) A grade of I may be reported by the instructor if for any reason she is unable to report the final grade at the regular time. (b) Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is recorded as F, and the course must be repeated in class if the student is to receive credit for it.
(4) Absent from final examination. (a) The grade X indicates that the student was absent from the regularly scheduled examination. (b) If absence has been excused by the Dean the student may take the examination as arranged by the instructor concerned. (c) If absence from the examination is not excused by the Dean, the grade for the course concerned is recorded as F. (d) A student with an X grade who has not obtained a passing grade before the end of the semester following that in which the X was incurred is regarded as having failed in the course concerned and must repeat the work in class in order to receive credit.

# *Class Attendance Regulations*

*General regulations for all students enrolled in nursing and nursing related courses.*

(1) In all nursing courses, students may take a ratio of unexcused non-consecutive absences in the proportion of one absence per semester hour, no more than one third of which may be taken from laboratory hours. However, instructors may specify certain required classes and/or laboratories from which no unexcused absence may be taken;

such absences would be considered as excessive, unexcused absences.

(2) Unexcused, consecutive absences, whether excessive or not, result in the loss of quality points as in the case of unexcused, excessive absences.

(3) When the student has incurred twelve absences, excused and unexcused, in any course she is required to drop the course unless the Dean and the instructor concerned grant special permission for her to continue in the course. (In a course of less than 3 s.h. a student may incur absences not to exceed ¼ of the class hour.)

(4) The first three tardies in a given course are counted as one absence. Thereafter, each additional tardy is counted as one additional absence.

(5) All absences taken immediately before and after announced holidays, holiday recesses, and/or vacation result in the loss of two quality points for each absence in each class.

(6) Each excessive or consecutive absence results in the loss of quality points as follows: one quality point for the first absence, two additional for the second, and three additional for the third. When the third unexcused, excessive or consecutive absence occurs, the student is debarred from the course with a loss of 6 quality points and an "F" in the course.

*For Junior and Senior students with a grade average of 3.0:*

Responsibility for punctual and regular class attendance is placed upon Junior and Senior students who, in a normal schedule earn grade average of 3.0 or above in the preceding term. They will be subject to no fixed absence limitations except for the specified required classes and for absences immediately before and after announced holidays, holiday recesses and/or vacations for which the usual consequences will apply. Instructors are expected to refer to the Dean for appropriate action, any student who in their opinion is causing her work or that of the class to suffer because of absences or tardies.

*Regulations for all students enrolled in general courses:*

A student is expected to attend class meeting regularly. Since, however, the University intends that the matter of class attendance shall be primarily the student's responsibility, no limitation of absences per course is prescribed. However, it should be recognized that one of the most vital aspects of a residential college experience is attendance and participation in the classroom, and that the value of this academic experience cannot be fully measured by testing procedures alone. Students are considered sufficiently mature to demonstrate the kind of self-discipline and personal responsibility required under the non-compulsory system. The student must recognize and

accept the consequences, if unwilling or unable to live under such a system.

In view of the fact that there will be a concentration of pressures on members of the student body to extend holiday periods, and that severely limited attendance would be detrimental to the conduct of the class as a whole, the following severe sanction is imposed for unexcused absences immediately before or after a holiday period: Any unexcused absence of a student on the last class day before or the first class day after an official holiday period shall result in suspension from the University. This suspension shall be immediate, except that if the absence is before or after the Christmas holidays, the suspension will not take effect until the end of the fall semester. The student may apply for readmission for the semester following suspension.

The summer recess and the period between semesters is not a "holiday period" within the meaning of this regulation. In order to ensure the orderly beginning of classes and to make spaces available to students who are in residence, the following regulations apply: Registration in a course shall be forfeited if a student does not attend the first meeting of the class and the space so vacated will be made available to other students. Class space will be reserved for students whose absence has been excused by the appropriate dean. If a student whose absence has not been excused returns within the first week of school, he must re-register for his courses. A student who returns after the first week may not enroll that semester and will be required to apply for readmission.

Absences from required classes due to illness when certified by a proper medical official will be excused. Absences from required classes due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the appropriate dean's office forty-eight hours in advance of the hour when their absences are to commence.

*Regulations applicable during the Summer Session:*

An undergraduate student who incurs more than three absences in a course, other than a nursing course (whether excused or unexcused) is ordinarily debarred from the course. Should she be permitted to remain in the course, full credit may not be allowed. The amount of reduced credit will be determined by the director of the Summer Session. Days missed through late registration are counted as absences, and three tardies in a given course are counted as one absence.

## *Other Regulations*

CONDUCT AND DISCIPLINE: The University expects of its students loyal and hearty cooperation in developing and maintaining

high standards of conduct as well as of scholarship. General University regulations concerning conduct of students will be made available to students when admission is offered, or under other circumstances, upon request. The student in accepting admission indicates a willingness to subscribe to those regulations. The University therefore reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of the Vice-President in the Division of Student Life. Immediate supervision is entrusted to the Dean. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morals and honor, the student body has properly become to a great degree self-governing. The duly elected representatives of the student body, exercise the authority granted the students to investigate all cases of misconduct, as well as all other cases of violation of proper student standards and traditions, and to make recommendations of penalties based on their findings. They exert a guiding and stimulating influence for the promotion of high ideals of conduct and of student relationships.

MOTOR VEHICLES: Freshmen are not advised to own or operate motor vehicles at the University. Members of the upper classes may operate motor vehicles, however, when in accordance with University regulations.

Students permitted to operate motor vehicles must register them annually at the beginning of the fall semester, or if the vehicle is acquired later, within five days after bringing it to the campus. Such students must show a state vehicle registration and a state operator's license, and also a standard certificate of automobile liability insurance, issued by a recognized company and evidencing coverage of at least $5,000 per person and $10,000 per accident for personal injury and $5,000 for property damage. At the time of the registration of the automobile the University will collect an annual student parking rental fee of $30.00 for each automobile.

ENROLLMENT AND REGISTRATION: Students in residence are required to submit, not later than the date of the spring registration, cards showing their selection of courses for the following year. Evidence of the payment of the continuing preregistration deposit of $25.00 is required before the card may be submitted. These cards, approved by the dean, are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the time appointed must be readmitted to the college by application to the Committee on Admissions. The same

regulations, with the exception of the advance deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that prescribed must pay to the Treasurer a fee of $5.00. They are counted as absent in the work they have missed in the professional courses to which they are admitted, and these absences carry the same penalty as do other absences from the professional courses. Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

## FIRST AID COURSE

All students are advised to complete a Standard Red Cross First Aid Course before the date of enrollment in the School of Nursing. For those students who will find it impossible to complete such a course in their home communities, the local Red Cross Chapter will offer this course at the School of Nursing. Because of the heavy course load, the student will be at a disadvantage in planning to complete the course at the School of Nursing.

# Requirements for Degree

## BACHELOR OF SCIENCE IN NURSING

THE SCHOOL OF NURSING offers a program which is planned to cover a period of four years; four academic years and three summer terms. At the completion of this program, the student receives the degree of Bachelor of Science in Nursing and is then eligible for the examinations given by the North Carolina State Board of Nurse Examiners.

The School of Nursing offers to carefully selected persons a program based on experiences which are designed in sequential patterns to promote a concatenation of learning and growth. Classes are kept small and close contact with the instructor is encouraged. Whether in the classroom, hospital, laboratories, community, or in the extracurricular activities, the development of the student's physical, mental and social well-being is the primary consideration of the faculty.

Graduates of the program are prepared as professional nurses for beginning positions in nursing and have the competencies and theoretical preparation on which to build further knowledge.

To fulfill the requirements for the degree of Bachelor of Science in Nursing, a student must complete the program with a C average, must complete 135 semester hours as outlined below, earn 270 quality points, and show proficiency in the practice of nursing.

The requirements for the degree of Bachelor of Science in Nursing are based on the principle that the student will derive the maximum benefit if the program includes a broad distribution of studies among representative fields.

For graduation with the degree of Bachelor of Science in Nursing, the following course work or equivalent must be completed.

These requirements are described in detail below.

| Uniform Course Requirements | S.H. |
|---|---|
| Natural and Biological Science | 20–23 |
| Social Sciences | 24 |
| English | 6 |
| Religion | 6 |
| Elective (Literature, Music, Art, or Philosophy preferred) | 6–9 |
| Physical Education | 2 |
| Major (Nursing and related work) | 68 |
| Total | 135 |

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

NATURAL AND BIOLOGICAL SCIENCE, 20 s.h.—To satisfy this requirement

a student must complete laboratory courses in Physiological Chemistry (3 s.h.), Zoology, Botany, Chemistry or Physics (8 s.h.), Anatomy and Physiology (6 s.h.), and Microbiology (3 s.h.).

RELIGION, 6 s.h.—To meet this requirement 6 semester hours may be chosen from Religion 1-2, 51-52, 55, 65, 85, 93.

SOCIAL SCIENCE AND HISTORY, 24 s.h.—The following courses will satisfy this requirement: Education 118, Psychology 91 and 116; and Sociology 91, 92, and 150. The remaining 6 s.h. may be selected from History (students who do not present for entrance 2 acceptable units of History must select History), Political Science 11-12, or 61-62, or Economics 51-52.

LITERATURE, MUSIC, ART, AND PHILOSOPHY, 6-9 s.h.—This requirement can be satisfied by a total of 6-9 semester hours in courses in English or American literature, foreign literature courses, literature courses in translation, courses in aesthetics, art, music, and courses in Philosophy (except 48, 103, 104, 109).

PHYSICAL EDUCATION, 2 s.h.—In the School of Nursing, Physical Education is required during the first year and must be completed by the end of the first year.

MAJOR AND RELATED WORK, 68 s.h.—This requirement is met by completing courses in the School of Nursing in accordance with the regulations described.

To complete the requirements in the regular period (four years) of study, the work is planned as follows:

### FIRST YEAR

| | | |
|---|---|---|
| English 1-2 | English Composition | 6 s.h. |
| History 1, 2 | Modern History | 6 s.h. |
| or | | |
| Political Science 11-12 | The American System of Government | |
| Religion 1-2 | The English Bible | 6 s.h |
| or | | |
| Elective | (Music 1-2, Art 1-2 or Philosophy) | |
| Nursing 1-2 | Interpersonal Relations in Nursing | 4 s.h. |
| Zoology 1-2 | Animal Biology, General Zoology | 8 s.h. |
| Microbiology 4 | Microbiology | 3 s.h. |
| Chemistry 50 | Chemistry | 3 s.h. |
| Psychology 91 | Introductory Psychology | 3 s.h. |
| Physical Education | | 2 s.h. |
| | | 41 s.h. |

### SECOND YEAR

| | | |
|---|---|---|
| Anatomy 51 | Anatomy | 3 s.h. |
| Physiology 51 | Human Physiology | 3 s.h. |
| Chemistry 51 | Physiological Chemistry | 3 s.h. |
| Nursing 91-92 | The Fundamentals of Nursing | 13 s.h. |
| Sociology 91, 92 | General Sociology | 6 s.h. |
| Nutrition 53 | Nutrition and Diet Therapy | 3 s.h. |
| Education 118 | Educational Psychology | 3 s.h. |
| Elective | (Art, Philosophy, or Literature) | |
| or | | |
| Religion | The English Bible | 6 s.h. |
| | | 40 s.h. |

### THIRD YEAR

| | | |
|---|---|---|
| Nursing 120 | Pediatric Nursing | 6 s.h. |
| Nursing 130 | Obstetric Nursing | 6 s.h. |
| Nursing 140 | Medical Nursing | 6 s.h. |
| Nursing 150 | Surgical Nursing | 6 s.h. |
| Sociology 150 | The Family | 3 s.h. |

| | | |
|---|---|---|
| Psychology 116 | Psychology of Adjustment | 3 s.h. |
| Nursing 180 | Public Health Sciences | 3 s.h. |
| | | 33 s.h. |

FOURTH YEAR

| | | |
|---|---|---|
| Nursing 160 | Social Foundation of Nursing | 3 s.h. |
| Nursing 170 | Psychiatric Nursing | 6 s.h. |
| Nursing 181 | Public Health Nursing | 6 s.h. |
| Nursing 190 | Medical-Surgical Nursing | 6 s.h. |
| | | 21 s.h. |

# *Description of Courses*

## EDUCATION

118. EDUCATIONAL PSYCHOLOGY.—A study of psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 3 s.h. BALLANTYNE, GEHMAN, MCHUGH

## ENGLISH

1-2. FRESHMAN COMPOSITION.—Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the 20th Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. STAFF

## ENGLISH AND AMERICAN LITERATURE AND LANGUAGE

55, 56. REPRESENTATIVE BRITISH WRITERS.—The following works are studied in the first semester: Chaucer's Prologue to *The Canterbury Tales* and at least two tales, Shakespeare's *I Henry IV, Hamlet* or *King Lear,* and one other play, John Donne's poetry (selections), Milton's *Paradise Lost* (selections) and some of the shorter poems; in the second semester: Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 6 s.h. (E & W) STAFF

57, 58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works. The first semester will include Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; the second will include James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. 6 s.h. (E & W) STAFF

## HISTORY

1, 2. MODERN HISTORY.—This course is an introduction to the study of modern history with special reference to the issues in the modern world. Topics selected for emphasis are: the contest between liberty and authority in the modern state; changing economic organization and theory—capitalism and the challenges to it; the problems of peace and war among the states; the changing faiths men live and die by. Beginning about 1500 with the rise of the European dynastic states, the story is pursued in the first semester to approximately 1848, and in the second through the two great world wars. The central theme in both semesters is the expansion of the influence of Western Europe throughout the world, with some attention to the rise of the United States as a world power. 6 s.h. (E & W)

Sophomores and juniors are not admitted to this course.

PROFESSOR ROPP AND STAFF

51, 52. MODERN HISTORY.—An introductory course for sophomores, juniors and seniors dealing with the topics indicated in the description of course 1, 2. 6 s.h.
Professors Parker and Ropp; Associate Professors Acomb, Hollyday, W. Scott and Young; Dr. Ginter; Mr. Cell

51X, 52X. MODERN HISTORY.—A special section for seniors who have had no other history at Duke and who wish a course in history before completing their college career. The topics covered will be essentially the same as those indicated in the description of course 1, 2. 6 s.h. Professor Ropp

## PHILOSOPHY

41, 42. KNOWLEDGE, FACT, AND VALUE.—An introduction to philosophy through the study of some of its main problems. These include, in Philosophy 41, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. In Philosophy 42 these include the nature and ground of values, ultimate goals and moral obligation. (Philosophy 42 may be taken before, or with, Philosophy 41.) 6 s.h. Staff

## POLITICAL SCIENCE

11-12. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. An introductory course for Freshmen dealing with the topics indicated in the description of Political Science 61-62. (Open only to Freshmen) 6 s.h. Associate Professor Hall; Assistant Professors Cheek and Kearney; Dr. Morgan

61-62. AMERICAN AND COMPARATIVE POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. The first semester is devoted to the study of American constitutional democracy. Topics examined include federal-state relations, the separation and interrelationships of the executive, legislative, and judicial branches of government, judicial review, the role of political parties and public opinion, the formulation and execution of domestic and foreign policy, civil liberties. The second semester is devoted to a study of constitutional democracy in Great Britain and France with emphasis upon the similarities and differences between those systems and our own. Detailed attention is also given to an examination of the theory and practice of totalitarian dictatorship as exemplified in the U.S.S.R. 6 s.h. (E & W)
Associate Professors Leach and Simpson; Visiting Associate Professor Jewell; Assistant Professors Cheek, Howard, and Kearney; Drs. Morgan and Piper; Messrs. Louink and Pilant

## REQUIRED PHYSICAL EDUCATION

Two semester hours to be completed in two semesters are included in the 135 hours required for graduates.

At the beginning of the freshman year, after a series of tests has been given, individual conferences are held and each student is guided into the type of activity she most needs, as determined from the evaluation of the test scores and the results of the conference. Courses in sports fundamentals, posture, rhythm fundamentals and swimming are offered for those who need to improve their skills in these areas. Students whose test scores are satisfactory will elect an activity from those offered by the Department.

For the last half of the first semester and for the two terms of the second semester, students take activities of their choice to complete their physical education requirement.

Professor Grout, Chairman: Professors Bookhout and Lewis; Associate Professors Eddy and Holton; Assistant Professors Lloyd, Spangler, Woodyard and Wray; Miss Raynor

## PSYCHOLOGY

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of normal adult psychology through a study of psychological methods as applied to motivation, emotions, perception, sensation, thinking, memory, learning, individual differences, and personality. 3 s.h. Staff

116. PSYCHOLOGY OF ADJUSTMENT.—The course is planned to give an adequate understanding of problems of adjustment and of mental hygiene. Lectures and discussions cover an application of the principles and findings of normal and abnormal psychology as these relate to the adjustment of the average individual in our changing society; a survey of the principles of mental hygiene; discussions of current socio-cultural trends significant for individual adjustment.

Not open to students who have had Education 68 or Psychology 100. 3 s.h. (w)
ASSOCIATE PROFESSOR REICHENBERG-HACKETT

## RELIGION

The uniform course requirement in religion may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

Students who have fulfilled the uniform course requirement in religion are eligible to elect any course numbered 100 or above, except those for which additional prerequisites are prescribed. Courses numbered below 100 may not be taken by those who have completed the uniform course requirement in religion.

1-2. THE ENGLISH BIBLE.—A comprehensive survey of the books of the Old and New Testaments. The literature is examined in the light of its origin in the history and religion of the people of the Bible, in order that its theological significance in its own day and in ours may be understood. Open only to freshmen. 6 s.h.
STAFF

51-52. THE ENGLISH BIBLE.—A survey of the Old and New Testaments, similar to Religion 1-2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1-2. 6 s.h. STAFF

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 3 s.h. STAFF

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to his contemporary significance. Prerequisite: Religion 55. 3 s.h. PHILLIPS

85. INTRODUCTION TO CHRISTIAN ETHICS.—A brief analysis of the Biblical and historical bases for the Christian understanding of man's moral situation, followed by a study of the social implications of Christianity in such areas of life as marriage, race, the political and economic order, etc. Consideration is given to the relation of Christian ethics to moral philosophy. Prerequisite: Religion 55. 3 s.h. LANGFORD AND MCCOLLOUGH

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primative culture, several of the major living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. 3 s.h. BRADLEY AND SULLIVAN

## SOCIOLOGY

91, 92. GENERAL SOCIOLOGY.—An introduction to the scientific study of social life; its origin, evolution and organization as illustrated in the study of a number of concrete social problems. 6 s.h. STAFF

150. THE FAMILY.—Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. STAFF

## ZOOLOGY

1. ANIMAL BIOLOGY.—The principles of biology as applied to animals. 4 s.h.
ASSOCIATE PROFESSOR KLOPFER, AND STAFF

2. GENERAL ZOOLOGY.—A survey of the animal kingdom. Prerequisite: Zoology 1. 4 s.h. PROFESSOR BOOKHOUT; ASSOCIATE PROFESSOR HUNTER AND STAFF

## HUMAN BIOLOGICAL AND PHYSICAL SCIENCE

*Anat.* 51. HUMAN ANATOMY.—The student gains an understanding and appreciation of body structure and its relation to normal functions in health and abnormal functions in disease. Audio-visual aids, including television, are used extensively and in conjunction with laboratory work the anatomical structures are demonstrated on dissected human specimens. 3 s.h.
PROFESSOR MARKEE AND STAFF

*Physiol.* 51. HUMAN PHYSIOLOGY.—A study of the normal functions of the human body with references to their applications in health and disease. 3 s.h.
DR. GERBER

Scores on a Chemistry Achievement Test administered during Orientation Week will be utilized to determine placement in the Chemistry courses (Chemistry 50 or Chemistry 51).

*Chem.* 50. CHEMISTRY.—A course in the fundamentals of general inorganic chemistry with particular emphasis on the needs of the student nurse. A brief introduction to organic chemistry. 3 s.h. ASSOCIATE PROFESSOR THIERS

*Chem.* 51. PHYSIOLOGICAL CHEMISTRY.—This course is designed to aid the student in understanding the chemical mechanism of the human body both in health and in disease. The student also acquires knowledge concerning the chemical basis of diagnosis and therapy. 3 s.h. ASSOCIATE PROFESSOR THIERS

*Micro.* 4. MICROBIOLOGY.—From the learning experiences included in this course the student is enabled to understand and appreciate her role in the prevention of microbial disease. 3 s.h. DR. A. G. EIRING

## NURSING AND ALLIED ARTS

N1-2. INTERPERSONAL RELATIONS IN NURSING.—This is an introductory course which is designed to assist the student in further developing concepts and skills that are basic to competence in interpersonal relations and nursing therapy. The student begins to define and amplify her concepts of the role of the professional nurse. Content of the course is based on the belief that a conscious possession of interpersonal concepts and goal directed behavior is basic to professional management of nurse-patient situations. 4 s.h.
ASSISTANT PROFESSOR JOHNSON AND STAFF

Nutr. 53. NUTRITION AND DIET THERAPY.—This course considers the nutritional needs of individuals of varying ages and methods of meeting these needs under different economic and social conditions. Accepted principles of diet therapy are presented on which dietary modifications are based, as well as the practices based on these principles. 3 s.h. ASSOCIATE PROFESSOR MCLACHLAN AND STAFF

N91-92. THE FUNDAMENTALS OF NURSING.—A study of the fundamentals of patient care which aims to give the student a basic knowledge and understanding of the principles and skills of nursing care. Throughout the courses, the student has correlated experiences in patient care and has the opportunity to participate in patient-centered conferences both of which are designed to assist her in the process of integrating the concepts of the behavioral and the natural sciences in her approach to nursing care problems. Emphasis is placed upon developing therapeutic nurse-patient relationships. 13 s.h.
ASSISTANT PROFESSORS CAMPBELL AND GOVER; MRS. AHLGREN;
MESDAMES CHURCH AND STRAUB, AND MISS MRAZ

N120. PEDIATRIC NURSING.—This course focuses on child care and the nurse-child-family relationships. Laboratory experiences include observation and participation in the care of children in hospital and non-hospital environments.
ASSISTANT PROFESSOR FORGIONE; MISSES AGNER
AND COLLINS, AND MRS. PAULSON

N130. OBSTETRIC NURSING.—This course focuses on maternal and infant care in the hospital and home. Emphasis is placed on support and guidance to the expectant family. 6 s.h. ASSISTANT PROFESSORS FORGIONE AND HORTON; MESDAMES PROCTOR, HOGUE, AND COUCH

N140. MEDICAL NURSING.—The classes and experiences of this course are designed to help the student identify the individual needs of medical patients and adapt her nursing care to meet these needs. Experiences are provided on the wards, out-patient clinic and related areas in the hospital. 6 s.h.
ASSISTANT PROFESSORS HARRIS, HOGSED; MISS LEMMOND

N150. SURGICAL NURSING.—The classes and experiences are designed to assist the student in developing a concept of continuity of nursing care for the surgical patient. Experiences are provided on the wards, in the operating room and in the recovery room. 6 s.h.
ASSISTANT PROFESSOR HARRIS; MRS. HIRSCH, MISS JANOSCRAT

N160. SOCIAL FOUNDATION OF NURSING.—A survey of major historical, philosophical, and sociological factors which have affected Nursing and Nursing Education. The purpose of the course is to give the student a better understanding of the place of nursing in present day society and the responsibilities of the individual nurse to society. 3 s.h. PROFESSOR JACOBANSKY

N170. PSYCHIATRIC NURSING.—This course focuses on dynamic psychiatric nursing therapy and dynamic psychiatry. It includes opportunities for learning under close supervision through experience with one patient at a time. 6 s.h.
ASSISTANT PROFESSORS JOHNSON AND MCCOLL; MISS RITCHIE; MRS. BULLOCK

N180. PUBLIC HEALTH SCIENCE.—This course offers a body of knowledge derived from the field of public health which includes an introduction to public health administration, environmental sanitation, bio-statistics and epidemiology. 3 s.h. Prerequisite to N181.
ASSOCIATE PROFESSOR BROCKER; ASSISTANT PROFESSOR WATLING; VISITING LECTURERS

N181. PUBLIC HEALTH NURSING.—This course provides opportunities to develop the philosophies and to study the principles and processes of nursing in a public health setting, through classes and selected community nursing experiences with faculty guidance at the Durham County Health Department. 6 s.h.
ASSOCIATE PROFESSOR BROCKER; ASSISTANT PROFESSORS CAMPBELL, WATLING, YOUNG; MISS MITCHAM

N191. MEDICAL-SURGICAL NURSING.—The classes and clinical experiences are designed to consider the more complex nursing problems encountered in nursing care. Opportunities are also provided for the student to further develop her competencies in leadership skills and problem solving techniques. 6 s.h.
ASSISTANT PROFESSORS HARRIS, WILSON, CADDELL, DAVENPORT

# Graduate Program of Study

# Graduate Program of Study

## *General Regulations Governing*

THE DEGREE of Master of Science is offered in the field of Medical and Surgical Nursing, Maternal and Infant Health*, Pediatric Nursing* and Psychiatric Nursing.*

## *Admission*

### REQUIREMENTS FOR ADMISSION TO GRADUATE STUDY IN NURSING

1. Completion of an NLN accredited baccalaureate degree program in nursing which prepares for professional practice in all fields of nursing. (Provisional admission may be granted to applicants not fully meeting this requirement).
2. A record of undergraduate study that meets general standards for admission to graduate study at Duke University.
3. State registration for the practice of nursing.
4. Two recommendations from persons who are acquainted with the applicant's professional ability and capacity for graduate study.
5. NLN Graduate Nurse Examination scores will be requested prior to admission from applicants whose records are marginal.
6. Satisfactory health appraisal.
7. A personal interview may be required.

PROCEDURE FOR ALL APPLICANTS: Interested nurses should write to the Director of Graduate Studies, School of Nursing, Duke University, Durham, North Carolina. A brief biographical statement should be included in this letter. The nurse will be furnished an application form. In addition to the completed form the following supporting documents should be provided: (1) transcripts of all undergraduate and graduate work mailed directly by registrars; (2) two letters of recommendation written by persons qualified to judge the applicants professional ability and capacity for graduate study; (3) a record of health appraisal; (4) evidence of registration to practice nursing; and (5) scores on qualifying examinations when requested.

DEADLINES FOR APPLICATIONS: The application and all supporting documents should be submitted to the Office of Admissions

* Not offered in 1964-1965.

not later than June 1 by those applying for the fall semester; before May 12 for admission to the first term of summer; and before June 18 for admission to the second term. It is the student's responsibility to make certain that her application is complete and in order before the dates specified. Students who are applying for Traineeship assistance are advised to assemble their credentials early in the calendar year in which they anticipate admission to graduate study.

NOTIFICATION AND STATUS: When the application is approved, the student will receive a letter of admission. The process of admission is not complete until a statement of acceptance has been returned by the applicant.

Applicants who are admitted will be offered either full admission or provisional admission. PROVISIONAL ADMISSION to one semester or a minimum of 12 hours of course work is offered to students who do not fully comply with admission requirements but appear to warrant admission. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and when upon review the student is granted full admission.

## *Registration*

WHO MUST REGISTER. (1) All students who enter course work for credit; (2) all students who have completed minimum requirements for an advanced degree but continue to use the facilities of the University in their research.

REGISTRATION. After the applicant has received notification of admission and has submitted a statement of acceptance of admission, she is eligible for registration.

LATE REGISTRATION. All students are expected to register at the time stated. *Those registering later are subject to a late registration fee of five dollars.*

CHANGE OF REGISTRATION. During the academic year within a period of fourteen days from the specified day of registration, students may change their schedules with the approval of the Director of the Graduate Program.

## *Grades, Hours, and Credits*

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in terms of course hours and credits. Peculiar to graduate study is the term *residence,* also generally measured in hours, to designate individual study apart from courses, such as writing a thesis and preparing for general examinations. Since September 1959 in this University,

graduate credit for courses and seminars, research, and residence, and corresponding tuition and fees have been stated in terms of UNITS. According to conventional measurement ONE UNIT is equivalent to ONE SEMESTER HOUR. Thus a course previously described as carrying a credit of 3 s.h. now carries a credit of 3 units.

GRADES. Grades in the Graduate Program are as follows: *E, G, S, F,* and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, for a satisfactory reason, at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, a statement of *No Credit* is made upon the student's record.

COURSES PRIMARILY FOR UNDERGRADUATES. Students granted provisional admission may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses *outside the major department* may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Director of the Graduate Program in the major department and in the department in which the course is listed.

NORMAL PROGRAMS. Normally graduate students who do not carry teaching or assisting duties carry a full load of graduate work until the requirements of the degree are met.

WITHDRAWAL AND INTERRUPTION OF PROGRAM. *From a course.* After 14 days from the date of registration students may drop courses only with the approval of the Director of the Graduate Program, the instructor of the course to be dropped, and the Dean of the School of Nursing. If the course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F.* If a course is dropped 30 days or more after the beginning of the class for the semester involved, the status of the student at the time of withdrawal from the course will be determined and be indicated by the designation *Withdrew Passing* (W.P.) or *Withdrew Failing* (W.F.).

*From the School.* The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the

School she should notify both the Director of the Graduate Program and the Dean of the School prior to the date of her expected withdrawal.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, provide in writing a statement of the reason for interruption, mailing address, and expected date of return.

TRANSCRIPT. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Records Office.

## *Financial Regulations*

GENERAL FEES IN THE ACADEMIC YEAR. The following tables show the general fees and changes collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Treasurer of the University for the settlement of fees.

| | |
|---|---|
| Tuition per semester | $525.00 |
| General fee* per semester | 93.50 |
| Summer Session .....per unit | 35.00 |

* General fees, in lieu of most special charges, include the following fees: Mathematics, Athletic, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Materials fees. Expenses for field trips are not included.

Tuition and fees for a full semester program of 16 units amount to $618.50. For a part program in the regular semesters, tuition and fees are computed at the rate of $35.00 per unit plus $5.00 fee for each course. Tuition and fees for course work in the Summer Session are computed at the rate of $35.00 per unit. Federal traineeships are available for a selected number of qualified applicants.

WITHDRAWAL FROM A COURSE OR FROM THE GRADUATE PROGRAM. Arrangements made with the Treasurer to prorate tuition and fees due do not imply that the full amount is not due and payable. A student who after 14 days after the date of registration withdraws from a course or from the Graduate School is liable for payment of full tuition fees and room rent.

LIVING ACCOMMODATIONS. Graduate students in the School of Nursing may occupy rooms in the School of Nursing residence. The rental charge for a single room is $465.00 for the 12 month period. The rental charge for a double room is $395 for each occupant. Rooms are rented for a period of not less than one semester unless special

arrangements are made through the Housing Bureau after official acceptance for admission to the University. Students may arrange for apartments or rooms in private homes in the city. The Housing Bureau of the University maintains a file of rooms and apartments listed with it for rental. Students may use this file as an aid to locating suitable living accommodations.

DINING SERVICE. Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates $1.75 to $2.25 per day, depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and, in addition, the Oak Room where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 P.M. The prices are the same as in the West Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

MEDICAL CARE. The complete medical facilities of the Duke University Medical Center are available to all members of the University community. To secure the benefits of the Student Health program, a graduate student during the term or semester in which the illness occurs must 1) in the Summer Session term be registered for at least 3 units, 2) prior to completing minimum residence requirements be registered for at least 9 units per semester. Students are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided at the Health Office in Hanes House.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions, and elective surgery.

Graduate students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefit shall be applied to the cost of their medical care.

MOTOR VEHICLES. Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 07 Allen Building within five days after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student should present the following documents: (1) state vehicle registration. (2) state operator's license, (3) evidence of automobile liability in-

surance as required by North Carolina law ($5,000 per person, $10,000 per accident for personal injuries; $5,000 for property damage).

STUDENT ACTIVITIES. Graduate students new to Duke University may be reminded that they are welcomed to use such recreation facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, drama, and religious groups. They may become junior members of the American Association of University Professors.

BUREAU OF TESTING AND GUIDANCE. The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

# Master of Science in Nursing

## *Philosophy and Purpose of Graduate Education*

At Duke University, Graduate Education in Nursing operates within the organizational structure of the School of Nursing and derives its rights and responsibilities from the statutes of Duke University. It conducts its educational programs in accordance with policies which regulate the educational status of graduate students within this University. While the School of Nursing regulates its own educational affairs, the graduate faculty in nursing maintains a cooperative relationship with other faculties within the University and utilizes the educational resources of other graduate programs that are appropriate to its purposes.

Fundamental to Graduate Education in Nursing is the philosophy of Duke University as epitomized by its motto, *Eruditio et Religio,* which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities and his responsibilities."

Graduate Education in Nursing takes its direction from the belief that nursing is a social institution designed to serve man in relation to his health status as determined by his preventive, therapeutic, and rehabilitative health needs. It draws from philosophy and from the natural and social sciences knowledges applicable to its own professional problems.

Graduate Education in Nursing contributes to the advancement of the profession of nursing by the development of understandings and abilities essential to leadership roles in nursing and their correlation with those of other health disciplines, to an extension of nursing knowledge and its application to current and emerging health needs of society, and to effective group functioning.

The ultimate aim of Graduate Education in Nursing is the improvement of nursing practice and of nursing education. To this end, Graduate Education in Nursing furthers individual professional de-

velopment and fosters the use of thought processes such as analysis, synthesis, and evaluation essential to the solution of problems associated with the provision of nursing services and the education and supervision of nursing personnel. It provides organized programs of study designed to realize its aim.

At Duke University, Graduate Education in Nursing has as its purpose the provision of learning opportunities for graduates of accredited baccalaureate programs in nursing to develop: advanced nursing competency in patient care; ability to communicate these learnings through the processes of teaching and supervising in nursing; ability to critically consume, utilize, promote and participate in research in nursing and allied health fields; and ability to assume and use leadership roles and resources for the advancement of the Profession of Nursing and for continued professional growth.

## REQUIREMENTS FOR THE MASTER OF SCIENCE IN NURSING

1. Satisfaction of subject matter deficits in undergraduate study that have resulted in provisional admission to graduate study, such as psychiatric and public health nursing and educational psychology or their equivalents.
2. Matriculation for the degree Master of Science in Nursing upon satisfactory completion of the initial 12 units of graduate work and the approval of the Director of Graduate Studies.
3. Satisfactory completion of the program of studies.
4. Passed comprehensive examination.

RESIDENCE REQUIREMENTS. Candidates for Master's degree must spend, as a minimum, one calendar year at Duke University. Often more time will prove necessary depending upon the nature of the student's program of studies.

TRANSFER OF GRADUATE CREDITS. Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum period of full-time registered residence at Duke University.

TIME LIMITS FOR COMPLETION OF MASTER'S DEGREES. The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of her first registration in the Graduate Program. Any candidate must complete all requirements within six calendar years of her first registration.

Credits earned over a longer period of time cannot be credited toward a degree.

In her graduate work the student must present satisfactory achieve-

ment for a minimum of 38 units of graduate credit. Nine of these units are earned outside of the major (Nursing) and are selected with the approval of the major professor from the course offerings in the natural and social sciences which correlate with her program of study in Nursing.

## GRADUATE STUDY IN NURSING

Emphasis is placed throughout graduate study in nursing on critical thinking and on the ability to analyze and evaluate situations, to identify problems, to synthesize knowledges for arriving at conclusions, solutions, or improvements, to teach and guide others, and to function within an organized social group such as a faculty or service agency.

The interrelatedness of principles and processes involved in nursing care and in the teaching and supervising of nursing is stressed. Problems affecting either or both are the content of nursing seminar.

Nursing theory, research process, and functional subjects are presented in a correlated manner and concurrently with directed experience in patient care and in the teaching or supervising of nursing care.

The curriculum also includes courses that enable the student to deepen understanding of the scope of nursing and of nursing education; the major problems confronting the profession; the changing social scene and related health organization and leadership roles in nursing; and the relatedness of nursing to other disciplines concerned with human welfare.

Theory concerned with human interacting and with the psychophysiological aspects of health and illness is offered. Provision is made for both intra and interdisciplinary communication and collaboration. Students are assisted toward a conscious and purposeful use of the professional self.

Research orientation is accomplished through theory in research process and methodology, nursing research seminar, and the inclusion of related researches in other course content. Students are required to define a research problem in nursing and to develop the research design. The completed dissertation is not a requirement for the Master of Science in Nursing. Research guidance is provided for the realization of the research requirement and is extended for the student who elects to complete the dissertation.

The general curriculum design for graduate study includes the following courses required of all graduate students of nursing:

**Research in Nursing** ..... (2 units)
**Seminar in Nursing Research** ..... (3 units)
**Principles and Processes of Teaching and Supervising in Nursing** ..... (2 units)

Curriculum Development and
Improvement in Nursing ..... (3 units)
Perspectives in Health Promotion
and Patient Services ..... (3 units)
Human Behavior and
Psychophysiology ..... (4 units)
Related Science ..... (9 units)

In addition, individual programs provide theory, practice and seminar for both the advancement of clinical nursing competency and the development of initial competency in teaching or supervising within the student's selected area of clinical specialization in nursing (12 units).

The program of study covers two semesters and the full summer session. Students are admitted in the Fall of each year.

## *Medical-Surgical Nursing Program*

*Fall Semester*

| | |
|---|---|
| *N231 Medical and Surgical Nursing | 6 units |
| N235 Research in Nursing | 2 units |
| N250 Human Behavior and Psychophysiology | 2 units |
| N233 Principles and Processes of Teaching and Supervising in Nursing | 2 units |
| Related Science | 3 units |
| | 15 units |

*Spring Semester*

| | |
|---|---|
| *N232 Medical and Surgical Nursing | 6 units |
| N234 Curriculum Development and Improvement in Nursing | 3 units |
| N251 Human Behavior and Psychophysiology | 2 units |
| Related Science | 3 units |
| | 14 units |

*Summer Session*

| | |
|---|---|
| *N237 Perspectives in Health Promotion and Patient Services | 3 units |
| N239 Seminar in Nursing Research | 3 units |
| Related Science | 3 units |
| | 9 units |

N231-232. MEDICAL AND SURGICAL NURSING (12 units).—Provides theory; directed experience in patient care and in the teaching and supervising of nursing; and nursing seminar. Studies and evaluates patient needs and related nursing process in light of natural, behavioral and health sciences. Stresses the continuum of care, rehabilitation philosophy and principles, and interdisciplinary collaboration for patient welfare. Seminar is directed at the identification, evaluation, and solution of problems affecting nursing and the teaching or supervising of nursing. Directed experience provides opportunity for: (1) advancing content, synthesizing knowledges and testing theories of nursing practice; and (2) the development of initial competencies in teaching or supervising in nursing.
(Fall and Spring Semesters) MISS MATTINGLY AND FACULTY

* Includes: Theory (2); Directed Clinical Experience (3); and Nursing Seminar (1).
* Includes: Theory (2); Directed Teaching or Supervision in Nursing (3); and Nursing Seminar (1).
* Includes: Theory (2); and Selected Field Observations (1).

N233. PRINCIPLES AND PROCESSES OF TEACHING AND SUPERVISING IN NURSING (2 units).—Considers the principles and processes of teaching and supervising and their application to nursing. Studies criteria for the selection and use of methods and materials in formal and informal learning-teaching situations in nursing. (Fall Semester) MISS MINNIEAR

N234. CURRICULUM DEVELOPMENTS AND IMPROVEMENT IN NURSING (3 units).—Studies trends and factors influencing curriculum development in nursing, educational programs in nursing, essentials to curriculum improvement, and criteria for program evaluation. MISS MATTINGLY

(Spring Semester, Prerequisite N233)

N235. RESEARCH IN NURSING (2 units).—Studies research process and methodology through analytical and critical review of research in nursing and related fields, the definition of individual research problems in nursing, and the formulation of research designs. (Fall Semester) MISS MATTINGLY

N237. PERSPECTIVES IN HEALTH PROMOTION AND PATIENT SERVICES (3 units).—Examines leadership roles in nursing as related to the current and emerging social scene and programming at the local, national, and international levels. Offers selected field observation and conference experiences. (Summer Session) MISS MINNIEAR

N239. NURSING RESEARCH SEMINAR (3 units).—Provides opportunity for students to present and justify their individual research problems and to analyze previous learnings toward the identification of additional problem areas for nursing research. MISS MATTINGLY

N250-251. HUMAN BEHAVIOR AND PSYCHOPHYSIOLOGY (4 units).—Presents the current theory of psychophysiology with the aim to develop deepened appreciation of the personality-illness relationship and of the influence of psychological factors in the genesis of somatic reactions and of somatic disease. DR. RECKLESS

RELATED SCIENCE. Students elect nine units of credit from the course offerings in the natural or social sciences which correlate with their nursing subjects and can be taken concurrently with them.

# BULLETIN
## OF
# DUKE UNIVERSITY




## The School of Law

ANNOUNCEMENTS FOR 1964-65

VOLUME 36 April, 1964 NUMBER 6-B

# Annual Bulletins

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# BULLETIN
OF
# DUKE UNIVERSITY

## THE SCHOOL OF LAW




ANNOUNCEMENTS FOR 1964-1965

DURHAM, NORTH CAROLINA
1964

"I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines, is, next to religion, the greatest civilizing influence. I request that this institution secure for its officers, trustees and faculty men of such outstanding character, ability and vision as will insure its attaining and maintaining a place of real leadership in the educational world, and that great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination and application evincing a wholesome and real ambition for life. *And I advise that the courses at this institution be arranged, first with special reference to the training of preachers, teachers, lawyers and physicians, because these are most in the public eye, and by precept and example can do most to uplift mankind, . . .*"

(From the Indenture of James B. Duke)

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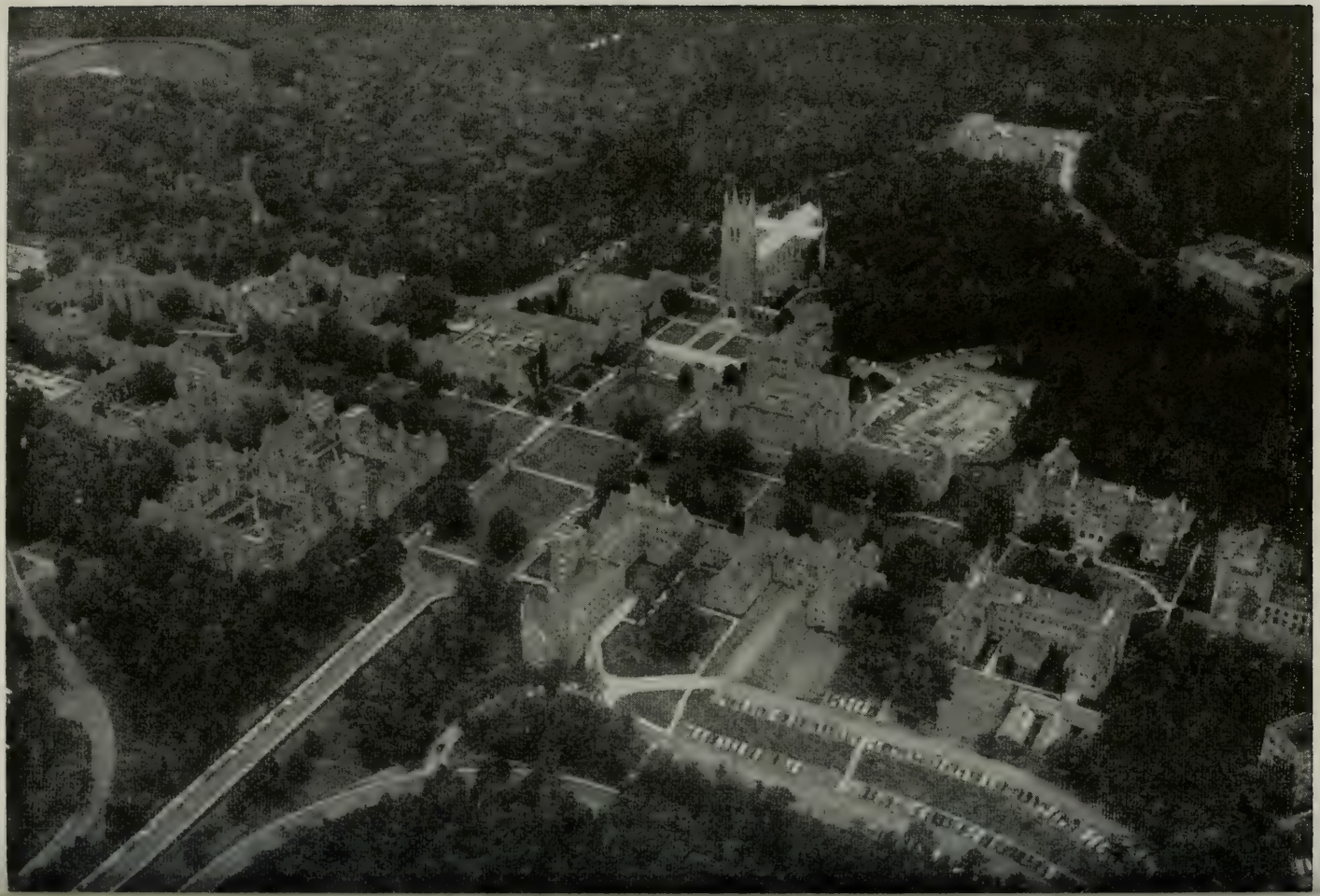
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# Calendar 1964-1965

1964

Sept. 14—Monday, Registration day for first-year students.

Sept. 15, 16—Tuesday and Wednesday, Registration day for second- and third-year student.

Sept. 17—Thursday, Classes begin, 8 A.M.

Nov. 25—Wednesday, Thanksgiving holidays begin, 1 P.M.

Nov. 30—Monday, Classes resumed, 8 A.M.

Dec. 19—Saturday, Christmas recess begins, 1 P.M.

1965

Jan. 4—Monday, Classes resumed, 8 A.M.

Jan. 9—Saturday, Fall semester classes end, 1 P.M.

Jan. 11—Monday, Mid-year examinations begin.

Jan. 22—Friday, Mid-year examinations end.

Jan. 25, 26—Monday and Tuesday, Registration for Spring semester.

Jan. 27—Wednesday, Spring semester classes begin, 8 A.M.

March 27—Saturday, Spring vacation begins, 1 P.M.

April 5—Monday, Classes resumed, 8 A.M.

May 21—Friday, Spring semester classes end, 1 P.M.

May 22—Saturday, Final examinations begin.

June 2—Wednesday, Final examinations end.

June 5—Saturday, Commencement begins.

June 7—Monday, Graduating exercises.

# Officers of the University Administration



Douglas Maitland Knight, Ph.D.
*President of the University*

Robert Taylor Cole, Ph.D.
*Provost*

Gerhard Chester Henricksen, M.A., C.P.A.
*Vice President for Business and Finance*
*Treasurer*

Everett H. Hopkins, LL.D.
*Vice President for Planning and*
*Institutional Studies and Assistant Provost*

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*Vice President for Institutional Advancement and*
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*Vice President for University Relations*

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Frank Traver de Vyver, Ph.D.
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*Dean of the Medical School and Vice Provost*

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*Librarian*

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*University Registrar*

John Marion Dozier, A.B.
*Business Manager*

Stephen C. Harward, C.P.A.
*Comptroller and Internal Auditor*

Olan Lee Petty, Ph.D.
*Director of the Summer Session*

Richard Lionel Predmore, D.M.L.
*Dean of the Graduate School of Arts and Sciences*

Craufurd D. W. Goodwin, Ph.D.
*Secretary*

Edwin Constant Bryson, LL.B.
*University Counsel*

# Faculty

Hans W. Baade, A.B., LL.B., LL.M., Dr.iur., Diplomé de Droit International, *Professor of Law; Editor,* Law and Contemporary Problems; *American Editor,* Journal of Business Law.

A.B. 1949, Syracuse University; Dr.iur. 1951, University of Kiel, Germany; LL.B., LL.M 1955, Duke University; Diplomé 1956, Hague Academy of International Law. Assistent, 1955, and Referent, 1956-1960, Institute of International Law, University of Kiel, Germany, Associate Professor of Law, Duke University, 1960-63; Professor of Law, 1964.

W. Bryan Bolich, A.B., B.A. (Juris.), M.A., B.C.L., *Professor of Law.*

A.B. 1917, Duke University; Duke University Law School, 1919-1921; B.A. (Juris.), 1923, B.C.L. 1924, M.A. 1928, Oxford University. General practice, 1924-1927; Member North Carolina House of Representatives, 1927; Legal Attaché American Embassy, Rome, 1950; Visiting Professor of Law, University of North Carolina, Summer 1951, 1955; University of Houston, Spring Semester 1957. Professor of Law, Duke University, since 1927.

John S. Bradway, A.B., A.M., LL.B., LL.D., *Professor of Law Emeritus.*

A.B. 1911, A.M. 1915, LL.D. 1957, Haverford College; LL.B. 1914, University of Pennsylvania. General practice, 1914-1929; Legal Aid Society of Philadelphia, 1914-1920; Chief Counsel, Philadelphia Legal Aid Bureau, 1920-1922; Secretary, National Association of Legal Aid Organizations, 1923-1940; President, 1940-1942; Visiting Professor of Law and Director of the Legal Aid Clinic, University of Southern California, Summer 1928; Professor of Law and Director of the Legal Aid Clinic, University of Southern California, 1929-1931; Vice-president, N.C. Bar Association, 1945-1946; Visiting Professor, University of North Carolina School of Social Work, 1949-1959. Professor of Law and Director of the Legal Aid Clinic, Duke University, 1931-1959; Professor of Law Emeritus, since 1959.

Edwin C. Bryson, LL.B., *Professor of Law.*

University of North Carolina, 1922-1925; Duke University, 1932-1933; LL.B. 1937, University of Oregon. General practice, 1927-1930. Assistant in Duke University Legal Aid Clinic, 1931-1947; Duke University Counsel since 1945; Associate Professor of Law 1947-1954; Professor of Law, since 1954.

Brainerd Currie, A.B., LL.B., LL.M., J.S.D., *William R. Perkins Professor of Law.*

A.B. 1937, LL.B. 1935, Mercer University; LL.M. 1941, J.S.D. 1955, Columbia University. Instructor in Law, Mercer University, 1935-1937; Assistant Professor of Law, Wake Forest College, 1937-1941; Associate Professor of Law, University of Georgia, 1941-1942; Professor of Law, Duke University, 1946-1949; Professor of Law, University of California, Los Angeles, 1949-1952; Dean and Professor of Law, University of Pittsburgh, 1952-1953; Professor of Law, University of Chicago, 1953-1961. Professor of Law, Duke University, since 1961.

Robinson Oscar Everett, A.B., LL.B., *Adjunct Professor of Law; Co-Editor,* Law and Contemporary Problems.

A.B. 1947, LL.B. 1950, Harvard University. Assistant Professor of Law, Duke University, 1950-1951; Military Service, Legal Officer in Air Force, 1951-1953; Commissioner of the U.S. Court of Appeals, 1953-1955; general practice, since 1955. Visiting Associate Professor of Law, Duke University, since 1956; Adjunct Professor of Law, since 1961.

J. Reid Hambrick, A.B., LL.B., *Visiting Professor of Law.*

A.B. 1938, Wofford College; LL.B. 1942, Duke University. Private practice, 1942-49; Internal Revenue Service, 1949-57; Associate Professor of Law, George Washington University, 1957-62; Professor of Law since 1962; Visiting Professor of Law, Duke University, spring semester 1965.

Paul Hardin, III, A.B., LL.B., *Professor of Law; Faculty Advisor,* Duke Law Journal.

A.B. 1952, LL.B. 1954, Duke University. General practice, 1954; Military Service, United States Army Intelligence, 1954-1956; general practice, 1956-1958; Visiting Professor of Law, University of Texas, Summer 1960. Professor of Law, Duke University, since 1963.

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A.B. 1955, Princeton University; J.D. 1958, Northwestern University. Military Service, 1958-60; Research Associate, Small Business Studies, Duke University, 1960-61; Private Practice, 1961-64; Associate Professor of Law, Duke University, since 1964.

John D. Johnston, Jr., A.B., LL.B., *Assistant Professor of Law and Assistant Dean; Editor,* Journal of Legal Education.

A.B. 1954, LL.B. 1956, Duke University. Private business, 1956-58; general practice, 1959-62. Assistant Dean and Assistant Professor of Law, Duke University School of Law, since 1962.

Arthur Larson, A.B., M.A., B.C.L., D.C.L., LL.D., *Professor of Law and Director of World Rule of Law Center.*

A.B. 1931, LL.D. 1953, Augustana College; M.A. (Juris.) 1938; B.C.L. 1957, D.C.L. 1957, Oxford University; Fellow of Pembroke College, Oxford. General Practice, 1935-1939; Assistant Professor of Law, University of Tennessee, 1939-1941; Davision Counsel, Office of Price Administration, 1941-1944; Chief, Scandinavian Branch, Foreign Economic Administration, 1944-1945; Associate Professor, Cornell Law School, 1945-1948; Professor of Law, Cornell Law School, 1948-1953; Fulbright Fellowship, London School of Economics, 1952; Dean, University of Pittsburgh Law School, 1953-1954; Under Secretary of Labor, 1954-1956; Director, U.S. Information Agency, 1956-1957; Special Assistant to the President 1957-1958; Special Consultant to the President on Rule of Law. Professor of Law and Director of World Rule of Law Center, Duke University, since 1958.

Elvin R. Latty, B.S., J.D., J.Sc.D., *Dean and Professor of Law.*

B.S. 1923, Bowdoin College; J.D. 1930, University of Michigan; J.Sc.D. 1936, Columbia University. Instructor in Romance Languages, University of Vermont, 1923-1927; general practice, 1930-1933; Special Fellow, Columbia University, 1933-1934; Associate Professor of Law, University of Kansas, 1934-1935; Professor of Law, University of Missouri, 1935-1937; Visiting Professor of Law, George Washington University, Summer 1937; Stanford University, Summer 1938; University of North Carolina, Summer 1942, 1947, 1949, 1956; University of Texas, Summer 1951; Fulbright lecturer, University of Pavia, Italy, 1954; Special Assistant to the American Ambassador, Caracas, 1942-1943; Acting Assistant Chief, Foreign Funds Control Division, U.S. Department of State, 1943. Professor of Law, Duke University, since 1937, and Dean of School of Law, since 1958.

Charles H. Livengood, Jr., A.B., LL.B., *Professor of Law.*

A.B. 1931, Duke University; LL.B. 1934, Harvard University. General Practice, 1934-1940; Regional Attorney for the Seventh Region, Wage and Hour Division, U.S. Department of Labor, 1940-1941; Chief of the Wage-Hour Section, Office of the Solicitor of Labor, 1941-1942; Lieutenant Commander, USNR, on active duty, 1942-1945; general practice, 1945-1948; Visiting Professor of Law, University of North Carolina, Summer 1948; George Washington University, Summer 1949, 1956; Fulbright Lecturer, University of Sydney, Australia, 1958-1959. Lecturer in Law, Duke University, 1946-1948; Associate Professor of Law, 1948-1951; Associate Editor, *Journal of Legal Education,* 1951-1952; University Marshal, since 1953; Professor of Law, since 1951.

Charles L. B. Lowndes, A.B., LL.B., S.J.D., *James B. Duke Professor of Law.*

A.B. 1923, Georgetown University; LL.B. 1926, S.J.D. 1931, Harvard University. General practice, 1926-1927; Assistant Professor of Law, Georgetown University, 1927-1928; Professor of Law, Georgetown University, 1928-1930; Research Fellow, Harvard Law School 1930-1931; Professor of Law, Georgetown University, 1931-1934. Professor of Law, Duke University, since 1934.

Malcolm McDermott, A.B., LL.B., *Professor of Law Emeritus.*

A.B. 1910, Princeton University; LL.B. 1913, Harvard University. General practice, 1913-1930; Dean and Professor of Law, University of Tennessee, 1920-1930; Visiting Professor of Law, University of Southern California, Summer, 1929; Legal Consultant, Department of Defense, 1951. Professor of Law, Duke University, 1930-1954; Professor of Law Emeritus, since 1954.

Robert H. Mundheim, A.B., *Visiting Professor of Law.*

A.B. 1954, LL.B. 1957, Harvard University; Frederick Sheldon Traveling Fellow, 1957-58; General Practice, 1958-61; U.S. Air Force, 1961-62; Associate Special Counsel to the Securities and Exchange Commission on Investment Company Act Matters, 1962-64; Visiting Assistant Professor of Law, Duke University, 1964.

Forest Hodge O'Neal, A.B., LL.B., J.S.D., S.J.D., *Professor of Law.*

A.B. 1938, LL.B. 1940, Louisiana State University; J.S.D., 1949, Yale University; S.J.D. 1954, Harvard University. Associate Professor of Law, University of Mississippi 1945-1946; Professor of Law, University of Mississippi, 1946-1947; Acting Dean and Professor of Law, Walter F. George School of Law, Mercer University, 1947-1948; Dean, Walter F. George School of Law, Mercer University, 1948-1956; Professor of Law, Vanderbilt University, 1956-1959; Visiting Professor of Law, New York University, 1957-1958. Professor of Law, Duke University, since 1959.

Joel Francis Paschal, A.B., LL.B., A.M., Ph.D., *Professor of Law.*

A.B. 1935, LL.B. 1938, Wake Forest College; A.M. 1942, Ph.D. 1948, Princeton University. Instructor in Law, Wake Forest College, 1939-1940; USNR, 1942-1946; Instructor, Princeton University, 1946-1947; Research Director, North Carolina Commission for the Improvement of the Administration of Justice, 1947-1949; general practice, 1949-1954; Visiting Professor of Law, Duke University, 1952-1953; Visiting Professor, University of North Carolina, Spring Semester 1956. Associate Professor of Law, Duke University, 1954-1959; Professor of Law, since 1959.

Melvin G. Shimm, A.B., LL.B., *Professor of Law; Faculty Advisor,* Duke Law Journal.

A.B. 1947, Columbia University; LL.B. 1950, Yale University. 2nd Lt. FA (AUS), 1943-1946; general practice, 1950-1951; Counsel, Wage Stabilization Board, 1951-1952;

Bigelow Fellow, University of Chicago Law School, 1951-1953; Visiting Associate Professor of Law, New York University, Summer 1957. Assistant Professor of Law, Duke University, 1953-1956; Associate Professor of Law, 1956-1959; Professor of Law, since 1959.

Dale F. Stansbury, B.S., LL.B., J.S.D., *Professor of Law Emeritus.*

B.S. 1914, Valparaiso University; LL.B. 1917, Indiana University; J.S.D. 1929, Yale University. Sterling Research Fellow, Yale University, 1928-1929; Deputy Attorney General of Indiana, 1918-1924, 1928; general practice, 1925-1927; Professor of Law, Mercer University, 1929-1935; Dean and Professor of Law, Wake Forest College, 1935-1944; Professor of Law, University of Tennessee, 1944-1946. Professor of Law, Duke University, 1946-1961; Professor of Law Emeritus, since 1961.

Lawrence G. Wallace, A.B., M.P.A., LL.B., *Associate Professor of Law.*

A.B. 1952, M.P.A. 1954, Syracuse University; LL.B. 1959, Columbia University. U.S. Air Force, 1953-1955; Staff, Maxwell Graduate School, Syracuse University, 1956; general practice, 1959-1960; Law Clerk to Associate Justice Hugo L. Black, U.S. Supreme Court, 1960-1961. Assistant Professor of Law, Duke University, 1961-63; Associate Professor of Law, since 1964.

Robert Renbert Wilson, A.B., A.M., Ph.D., LL.D., *Professor of Political Science and International Law.*

A.B. 1918, Austin College; A.M. 1922, Princeton University; Ph.D. 1927, Harvard University; LL.D. 1940, Austin College. Carnegie Fellow in International Law, 1922-1923, 1924-1925; Member, Advisory Committee, Harvard Research in International Law, 1935—; Member, Board of Editors, *American Journal of International Law*, 1937—; President, American Society of International Law, 1957-1958; United States Department of State; Assistant in Treaty Division, 1931-1932; Advisor on Commercial Treaties, 1944-1946; Consultant on Commercial Treaties, at various times, 1946-1953; Fulbright Professor Law School of Istanbul University, 1951-1952. Assistant Professor of Political Science, Duke University, 1925-1927; Associate Professor, 1927-1929; Professor, since 1929; Chairman, Department of Political Science, 1934-1948; Director, Graduate Studies in Political Science, 1937-1947, and since 1949; Professor of International Law, since 1948.

## LECTURER IN LAW

Willard J. Graham, A.B., A.M., Ph.D., C.P.A., LL.D.

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# The School: Its Purpose and Methods

THE OFFICIAL NAME of the School is the Duke University School of Law, but it will be referred to in these pages as the Duke Law School or the Law School.

The Duke Law School stems historically from the School of Law of Trinity College, with its history of legal instruction running back to the middle of the past century, antedating the Civil War. When, in the 1920's, Trinity College became Duke University, the Law School was completely reorganized. This reorganization culminated with the housing of the Law School on the new West Campus in 1930, when the character of the Duke Law School can be said to have been reshaped.

The curriculum of the Law School provides thorough preparation for the practice of law in any state, and its graduates have been admitted to the bar throughout the nation. Opportunities for specialization in particular branches of the law are afforded.

In carrying out the trust imposed by the indenture establishing the Duke Endowment, the Law School seeks to have the student acquire knowledge and comprehension not only of legal doctrine, but also of the judicial process and of the social, economic, and political problems with which law and lawyers must deal. The method of instruction employed compels analysis of judicial opinions and inquiry into the nonlegal as well as the legal considerations which underlie them. In appropriate courses, special consideration is given to the work of the legislative and administrative agencies of government. In recognition of the increasing importance of the role of the lawyer in representing private interests before government agencies and in government service, a broad program is offered in the public law field. Scope for creative student work is provided by seminar courses and supervised individual study and research.

Practical training is not left for the first years of practice. A carefully integrated series of courses is designed to give students actual experience in the work of lawyers. Legal research, writing courses, moot court work and practical study of steps in law suits in the first and second years are followed in the third year by seminar courses emphasizing trial techniques, legal planning and drafting and interdisciplinary approaches. A student bar association affords a means whereby the student may gain acquaintance with the professional organizations through which a lawyer may and should contribute to the well-being of his profession and society.

# Admission, Registration, and Fees

## *Admission*

### DIRECTIONS TO APPLICANTS FOR ADMISSION

APPLICATION must be made on the prescribed Law School application blank which will be sent upon request. A fee of $10.00 is charged for filing an application. No applicant will be accepted until all required documents are on file. These documents are: (1) the application itself, to which a recently made personal photograph must be attached; (2) a transcript of college record (see next paragraph); (3) a report of the applicant's score on the Law School Admission Test, described below; (4) letters from an official of the college attended and from three or more responsible persons who are acquainted with the applicant's character and general qualifications. *These letters will be requested by the Law School,* and the applicant need only furnish the names and addresses of persons from whom the desired information can be obtained.

Most of our applicants apply at a time when they are still in college, either in the fall or winter of their current college year. We do not ordinarily wait for the completion of the current year's college work before admitting an applicant; normally we take acceptance action on the basis of a transcript showing college work through the junior year, although we may at times ask for a transcript showing also one semester or term of the senior year. Such acceptance is tentative only and is subject to our final action taken in the light of the further supplemental transcript showing all the college work required for admission to the Law School. (However, it is very rare for an accepted applicant to be later rejected on the basis of his completed transcript.) A good time for a student in college to apply, particularly if he has an outstanding record and wants to make his law school plans early, is in the fall of his last year.

Admitted applicants are required to deposit the sum of $50.00 with the Office of the Bursar. This deposit is non-refundable, but will be credited to the account of the matriculated student.

The Law School Admission Test, referred to above, is administered by the Educational Testing Service. It is given four times a year at examination centers conveniently located throughout the United States. No special preparation for the test is suggested, since it is designed to measure aptitudes, abilities and general background rather than knowledge of subject matter. The applicant's score on the test

will be considered along with other data in passing upon his admission to the Law School. Application forms and information concerning the test should be procured by writing directly to the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

## TIMES OF ADMISSION

Beginning students may enter only at the opening of the fall semester in any year. Students who have completed the first year of law study at this or any other law school approved by the Association of American Law Schools may enter at the beginning of any semester.

## REQUIREMENTS FOR ADMISSION

An application for admission to Duke Law School as a candidate for the degree of Bachelor of Laws may be submitted by any person who is a graduate of a college of approved standing. Applications may also be submitted by a candidate who has completed in a college of approved standing work equivalent in number of units to three-fourths of that required for graduation and whose college work is of outstanding superior quality and in its entirety shows an average grade far above that required for graduation, the requirement in each case being determined by the regulations of the college where the work was taken.

## COMBINED COURSE

A number of colleges, upon application by their students, have permitted those who have completed three years of undergraduate work to enter the Duke Law School and upon the satisfactory completion of the first year of law school work to receive their Bachelor of Arts degree from such colleges. It is suggested that students desiring to enter Duke Law School under such a program make inquiry of their proper college authorities regarding this point if they meet the applicable requirements of the preceding paragraph.

A student from an undergraduate college of Duke University who has completed therein three years of study may apply to that college to enroll in a combined course wherein his first year of law study may be accepted toward the Bachelor of Arts degree. Upon the completion of four additional semesters of law study, he will receive the Bachelor of Laws degree.

Students considering entrance before obtaining the Bachelor's degree should consult the rules of the Board of Bar Examiners in the state where they plan to practice law, for regulations applicable to this program.

## ADMISSION TO ADVANCED STANDING

Any person who has complied with the requirements for admission set forth in this announcement prior to the commencement of his law study, who presents evidence of the satisfactory completion of at least

one year of study at any law school which is a member of the Association of American Law Schools, and who is eligible for readmission to the law school from which he proposes to transfer, may be admitted to advanced standing, subject to such rules as would be applicable to students in this School having a comparable scholastic record. Provisional credit for courses so completed will be given, final credit being conditioned on the completion of at least one full year of law study in this School with an average at least five points above the passing grade. Adjustment of credit for work done in such other law schools may be made by the Dean or by vote of the Faculty.

### CANDIDATES FOR GRADUATE DEGREES

Applications for admission to graduate study should be addressed to the Dean of the Law School and should include transcripts of records of legal and prelegal work. For the requirements for the graduate degrees, see pages 21-24.

## *Registration*

All students are required to register on the dates prescribed in the Law School Calendar, at which time class schedules and course cards must be filled out and approved. A student's registration for any semester is not complete until he has settled all indebtedness with the Office of the Bursar. Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a $5.00 penalty for late registration.

### REGISTRATION FOR BAR EXAMINATION

Many states now require that a student, prior to or shortly after beginning of the study of law, register with the board of bar examiners of the state if he intends to practice therein. Each student should ascertain by writing to the secretary of the board of bar examiners of the state in which he plans to practice, or by other channels of information, whether that state makes this requirement.

### CONDUCT OF STUDENTS

All students are admitted subject to the rules of the University and of the Law School, and continuance in the School is conditioned upon the observance of such rules.

The University expects of its students loyal and hearty co-operation in developing and maintaining high standards of conduct and scholarship. The University, therefore, reserves the right, and matriculation is a concession by the student of this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University.

## *Fees and Expenses*

Tuition is due and payable not later than the day of registration for a particular semester. For the academic year 1964-1965, the tuition is $600.00 a semester. After the final day of registration no refund of the tuition will be made except for involuntary withdrawal to enter the armed forces.

Law students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of $15.00 per year plus any taxes that may be imposed. (This fee is payable in the fall semester.) They also may use the facilities of the Duke Golf Course upon payment of student green fees.

It is estimated that the expenses of a thrifty unmarried student at Duke Law School, aside from tuition, can be kept around $1,250.00 per academic year.

Additional fees and expenses are discussed under the headings Living Accommodations, Dining Service, and Motor Vehicles.

## *Scholarships, Loans, and Employment*

Scholarships are available, varying in amount. Except for a few scholarships that are based purely on merit, scholarships are awarded only to needy applicants with markedly superior college records and comparable Law School Admission Test scores. A scholarship may cover all or part of the tuition charge. The more usual form of financial aid is a combination of scholarship and loan. Optimum administration of scholarship funds may compel the School to give preference, as between applicants with substantially equal credentials, to those not seeking scholarship aid. Scholarship grants will be continued to second- and third-year students maintaining a high standard of work.

To the extent of the funds allocated to Duke University from its participation in the student loan program established under the National Defense Education Act of 1958, loans up to $1,000 per year (so limited as of the present writing) are available to Duke students. Interest on these loans begins to accrue at three per cent one year after the student leaves the School, and repayment normally begins two years after the student leaves the School, with complete repayment scheduled over a ten-year period.

Loans from funds held in trust by the University are also available to qualified law students. Interest on these loans, which mature after the student has left the School, accrues from the date of each note at the rate of one per cent until the student has left the School and for five years thereafter at three per cent per year, with repayment in

installments over the five-year period. Loans from these funds are available up to $1,200 per year, less the amount of any loan made under the paragraph above.

Approval of loan application is based on the financial need, scholastic attainment, and personal integrity of the applicant. Unmarried students with automobiles, who plan to live on campus, must establish a bona fide need for the automobile before a loan application will be approved. It is hoped that for 1964-65 and 1965-66 sufficient loan funds from the sources mentioned in the two paragraphs above will be available for all Duke students in serious financial need, even for those with scholarships.

In addition to the loans above mentioned, the School participates in the United Student Aid Fund program. This program provides guaranteed commercial bank loans (on usual bank terms) to needy law students, up to $1,000 per year. These loans are readily available.

A special fund is also available for law students for small loans to tide over temporary financial emergencies arising during the course of the year.

Although it is not advisable for a law student to undertake any substantial amount of outside work, arrangements have been made to provide part-time employment for capable law students who otherwise would be unable to meet the expense of studying law at Duke.

A number of positions as assistants in the Law Library and as research assistants are open to students, particularly in their second or third year, with some preference being given to those who do not receive other aids from the University.

## *Living Accommodations*

The Men's Graduate Center is available to men enrolled in the Law School. The rooms are equipped for two persons and the rental charge for a double room is $500.00 for the academic year or $250.00 for each occupant ($125.00 per semester for each occupant).

Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School. The rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant ($137.50 per semester for each occupant).

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the rental charges per month are $70.00 for the efficiency, $80.00 for the one-bedroom, and $90.00 for the two-bedroom. Heat, electricity except for window fans and air conditioners, hot and cold water, garbage and

trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Residence hall rooms and Duke University Apartments may be reserved by new applicants after they have been accepted officially for admission to the School of Law. Applications for residence hall rooms are to be made to the Housing Bureau, Duke Station, Durham, North Carolina. A $25.00 deposit is required of each applicant before a residence hall room reservation is made. The initial room deposit is effective during the student's residence in the University residence halls if attendance is continuous in regular academic years. The deposit will be refunded under the following conditions:

a. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.

b. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.

c. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Rooms are rented for the academic year but for no period of less than one semester without special arrangements. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing.

## DINING SERVICE

Food service is cafeteria style. The cost of meals runs approximately $1.75 to $2.50 per day, depending on the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and the Oak Room where full meals and *a la carte* items are served.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 A.M. to 11:00 P.M. The prices in these dining rooms are the same as on the West Campus.

## MOTOR VEHICLES

Each motor vehicle operated on the campuses by students enrolled in the School of Law must be registered at 05 Allen Building within 5 days after arrival, and thereafter must display the proper registration emblem. To register a vehicle, the student must pay the prescribed fee of of $30 and present the following documents:

1. State vehicle registration.
2. State operator's license.
3. Evidence of automobile liability insurance as required by North Carolina law: $5,000 per person and $10,000 per accident for personal injuries, and $5,000 property damage.

Parking, Traffic, and Safety Regulations will be given each student registering his vehicle. Students are expected to abide by these regulations.

## MEDICAL CARE

With exceptions noted below, full medical and surgical care is furnished to all regularly matriculated law students of the University who have paid the semester tuition. This service is under the direction of the Physician in charge with the co-operation of the Staff of Duke Hospital. It includes hopitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward (but not special) nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernia, elective surgery, chronic skin conditions, endocrine disturbances, etc., or accidents or illnesses occurring during vacations

or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as special nursing, must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care.



Further information will be sent upon request. Address

THE DEAN OF THE SCHOOL OF LAW
DUKE UNIVERSITY
Durham, North Carolina

# Bachelor of Laws Degree

UPON favorable recommendation of the Faculty, the degree of Bachelor of Laws will be conferred on students who shall have successfully completed six semesters' study of law, the last two semesters of work immediately preceding the granting of such degree having been completed in this School.

A student shall be deemed to have completed successfully six semesters' study of law if during this period he has

(1) secured a passing grade in courses aggregating 84 semester hours;

(2) secured in every required course a grade not requiring repetition thereof; and

(3) secured a weighted average at least five points above passing, whether computed by including or by excluding the grades in the first-year courses.

Students who have spent only their last two semesters of study in residence in this School must have received a weighted average at least five points above passing for that year.

## MINIMUM AND MAXIMUM STUDENT LOADS

No regular student is permitted to take less than twelve course hours per semester.

No first-year student is permitted to take courses in excess of the first-year program. Second- and third-year students are not permitted to take for credit more than sixteen course hours per semester, nor to audit and take for credit more than seventeen course hours per semester.

In exceptional cases, students may petition the Faculty for permission to take more or less than the prescribed maximum or minimum loads, but no student shall receive full residence credit if he takes fewer than ten hours per semester for credit.

## ATTENDANCE

Regular class attendance is required. The right to take the examinations, as well as the privilege of continuing one's membership in the School at any time, is conditioned upon regular attendance at the exercises of the School.

## STANDARDS OF SCHOLARSHIP

GRADES.—The final grades in each course are given in numerical terms which are equivalent to letter grades according to the following scale: 80 to 100, A; 70-79, B; 55-69, C; 50-54, D; 0-49, F.

A grade of 50 is necessary for passing a course. Grading policy (including repetition of courses failed) is prescribed by the Law School Rules.

ELIGIBILITY TO CONTINUE LAW STUDY.—Any student who at the end of his first year or at the end of any subsequent semester has an average grade lower than 50 on all the work then taken is ineligible to continue his work in the School. Any other student (1) whose average final grade at the end of his first semester is below 50, or (2) whose average grade at the end of any subsequent semester on all the work then taken is below 55, (3) who in any single semester or in any single year receives failure grades in courses totaling eight or more semester hours, may at any time be declared by the Dean ineligible to continue.

NOTIFICATION OF UNSATISFACTORY SCHOLASTIC STANDING.—Every student subject to the provisions of the second sentence of the paragraph above, who has not been declared ineligible to continue his work in the School will be given a formal, written notice by the Dean's Office. This notice will set forth his average grade or grades and inform him (1) that he will be subject for the ensuing year to the special supervision of the Dean, who may order his dismissal from the School in the event of his failure to maintain a satisfactory scholastic standard, and (2) that he will be ineligible to receive a degree unless his work meets the scholastic requirements for graduation, which will be set forth in full in such notice.

Every other student whose average final grade at the end of any semester on the work of that semester, or on all work then taken, does not exceed the minimum average grade required for graduation by more than two points will be given a notice similar to that provided for above.

# Graduate Work in Law

## *Objective of the Graduate Study Program*

THE graduate program is framed with a view to the encouragement and recognition of legal scholarship. It is designed for the qualified candidate who aspires to a teaching career, or who wishes to become proficient in a special field of the law, to do legal research, to prepare himself for a public-law practice in or out of government, or to pursue studies in subjects he has not previously explored. This program is especially suitable for law teachers and for those who wish to become either law teachers or specialists in the law and who wish to carry on advanced study and original research under faculty supervision, and for foreign law students, teachers and lawyers who desire to extend their knowledge of the laws of the United States and to engage in comparative legal research.

Three graduate degrees are granted: the degree of Master of Laws (LL.M), the degree of Master of Comparative Law (M.C.L.), and the degree of Doctor of Juridical Science (S.J.D.).

## *Master of Laws*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF MASTER OF LAWS

Any person who has received the first degree in law from a law school which is a member of the Association of American Law Schools, or from a university in the United Kingdom of Great Britain and Northern Ireland, or in Australia, Canada, Eire or New Zealand, may be admitted as a candidate for the degree of Master of Laws, provided he satisfies the Committee on Graduate Study that his objective in desiring to do graduate work in law is consistent with the purposes for which the program is offered, and provided he demonstrates to the Committee, on the basis of his record, his capacity to take and profit by graduate work in law. Normally the applicant will be required to show a level of scholarship appreciably higher than that required for the first degree in law at the institution from which he received that degree. Those applicants who aspire to a teaching career are expected to have had, and are expected to maintain throughout their graduate studies, an exceptionally high academic record.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF LAWS

The degree of Master of Laws is reserved for students who, having demonstrated their capacity for graduate work in law, maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

The candidate for this degree is required to complete a course of study comprising not less than twenty nor more than twenty-six semester hours, or approved research equivalent thereto. Two full semesters are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses or seminars selected from those offered in Jurisprudence, in Legal History, and in the International or Comparative Law area. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit of not more than two hours a semester may be given for approved special supervised-research projects. In addition to completing twenty semester hours of courses or seminars the candidate must prepare and submit an essay, representing substantial research on a legal subject. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. The candidate will find it helpful to have formulated a project of research, or alternative projects, before his admission to graduate study or, at any rate, before pursuing his graduate study in residence. In appropriate cases, the candidate will be permitted, and may be encouraged, to take related work in other departments of the University.

## *Master of Comparative Law*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF MASTER OF COMPARATIVE LAW

Any person (1) who has received the degree of *doctor iuris* or its equivalent from a foreign university, or (2) who, having completed such academic training as is required in his country for the practice of law, has already demonstrated his special qualifications by publications in learned journals or otherwise, and who has the knowledge of and facility in the English language needed to achieve distinction in competitive study at an American university may be admitted as a candidate for the degree of Master of Comparative Law (M.C.L.). The applicant must satisfy the Committee on Graduate Study that his objective in doing graduate work in comparative law is consistent with the purposes for which the program is offered, and he must further demonstrate to the Committee, on the basis of a scholastic record comparable to at least a B average at an American law school of high standing, and by his previous publications, if any, his capacity to profit by graduate work in law. Normally, admission to candidacy for this

degree is limited to applicants who intend to study one or more specific fields of American law with a view to utilizing such knowledge upon their return to their respective countries, and who have already done some preparatory work in this direction.

Any person eligible to be admitted as a candidate for the degree of Master of Laws may, upon recommendation of the Committee on Graduate Study, be admitted to candidacy for the degree of Master of Comparative Law.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF COMPARATIVE LAW

The degree of Master of Comparative Law is awarded only to students who maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

The candidate for this degree is required to complete a course of study comprising not less than twenty semester-hours. At least two semesters' residence are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses from those offered in the World Law and Comparative Law area, and either Jurisprudence or Legal History. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit for not more than two hours a semester may be given for approved, supervised-research projects. The candidate is also required to submit an essay representing substantial research on a subject of comparative or international law, written in the English language. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. In appropriate cases, the candidate may be permitted and may be encouraged, to take related work in other departments of the University.

## *Doctor of Juridical Science*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF DOCTOR OF JURIDICAL SCIENCE

A person holding the degree of Master of Laws or Master of Comparative Law (or Jurisprudence) from this or any other law school which is a member of the Association of American Law Schools may, on recommendation of the Committee on Graduate Study and favorable vote of the Faculty, be admitted to candidacy for the degree of Doctor of Juridical Science (S.J.D.), provided he completed the work for the Master's degree with distinction.

## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF JURIDICAL SCIENCE

Upon recommendation of the Faculty, the degree of Doctor of Juridical Science will be conferred on students admitted to candidacy for that degree who complete and submit a monograph or series of essays suitable for publication and deemed by the Faculty to be of distinguished character and who pass an oral examination before a special committee appointed for that examination. At least one academic year and, in the absence of an extension granted by the Faculty, not more than three years must elapse between the award of the Master's degree and the award of Doctor of Juridical Science. Students who have received the Master's degree from another law school must spend at least two full semesters engaged in research at this School, and in addition may be required to complete a course of study prescribed by the Committee on Graduate Study. The monograph or series of essays required may be based upon, or be an extension of, the essay required for the Master's degree, provided substantial additional research is represented.

# Facilities and Activities

## *The Law School Building and Its Facilities*

THE NEW Law School Building was completed and occupied in September, 1962. Located just off the Gothic core of the West (main) Campus, the building is of modified Georgian architecture with contemporary overtones. It reflects a notable characteristic of the School: a high ratio of facilities to students admitted. Despite long-range plans to keep the student body modest in size, the new Law Building in its general spaciousness, number of classrooms and seminar rooms, library reading-room seatings, library stack spaces, student carrels, student lockers, student lounge rooms, faculty offices, quarters for legal publications, special quarters for institutional studies and courtroom is of proportions ordinarily associated with a far larger student body.

Additional information concerning the Law School and its facilities is contained in the illustrated brochure *Studying Law at Duke.*

### THE LAW LIBRARY

The Law Library is one of the large law school collections in the country. It consists of American and English statutory and case law; collections of international, comparative and foreign law materials; treatises, digests, encyclopedias; the various selected case series; a comprehensive collection of legal periodicals; and publications in the fields of history, economics, government, and other social sciences, supplemental to the strictly legal materials. The Library receives every current legal periodical of general interest printed in the English language and complete up-to-date legislation of the United States and of every state and territory of the Nation.

There are many thousands of additional volumes of a legal nature in the main University Library Building, as well as the general collection of over a million volumes, to all of which the law students and Faculty have convenient access.

The Law Library is administered by a professionally trained staff and is open to the public daily, as well as in the evenings when the Law School is in session.

### WORLD RULE OF LAW CENTER

In the fall of 1958, the Duke Law School established its World Rule of Law Center, with Professor Arthur Larson as its Director.

The purpose of the Center is to undertake both long-range and current studies and publications bearing on the settlement of international disputes and the achievement of peaceful change under law. Typical projects include "Sovereignty within the Law"; "Propaganda within the Law"; a definitive analysis of the World Court; and a series of studies of United Nations peace-keeping devices. A staff of about ten international lawyers is maintained, together with an undergraduate law student research assistant staff which generally numbers about twelve. The regular staff includes specialists in all the world's major legal systems. Opportunities for course work at the Law School include not only the regular courses in International Law, Comparative Law, and the Law of International Economic Relations, but a unique Seminar in World Law for students particularly interested in this approach to the problem of world order.

Duke University students are also encouraged to combine graduate work with activities of the Center, opportunities for which are made available as far as practicable.

## *Publications*

### LAW AND CONTEMPORARY PROBLEMS

The School of Law publishes a quarterly, *Law and Contemporary Problems,* edited by Professor Hans W. Baade. This periodical, now in its twenty-ninth volume, presents in each issue a symposium on a problem of current importance, in which the inter-related social and economic, as well as legal, factors are discussed by writers of competence in these respective fields.

The circulation of *Law and Contemporary Problems* extends not only to members of the legal profession and law libraries throughout the country, but also to industrial and financial concerns, governmental agencies, and public and general university libraries. Individual issues are not infrequently used as materials for study in University courses.

### JOURNAL OF LEGAL EDUCATION

The *Journal of Legal Education,* a quarterly, is also edited at the School of Law, under the direction of Professor John D. Johnston, Jr. The publication serves as the organ for the Association of American Law Schools, providing a clearing house for ideas and professional studies in the constantly expanding field of legal education. The editorial policy of the *Journal of Legal Education* is determined by an editorial board named by the Association, assisted by an advisory committee consisting of prominent legal educators.

### DUKE LAW JOURNAL

American legal education boasts at least one unique institution. Only in America, and only in law, are the scholarly professional journals edited and largely written by students. The *Duke Law Journal* carries forward this proud tradition, which dates from the latter part of the nineteenth century. Articles written by teachers, lawyers, judges and other scholars are critically evaluated and edited by the board of student editors. Notes and comments concerning recent judicial, legislative and other developments are written by the students themselves, and edited by their fellow students. Members of the Faculty are of course available for advice and consultation. The quarterly issues are widely circulated, and become an integral part of the storehouse of informal and critical materials to which the profession in all its branches must resort. The student-edited law journal has had a profound influence on the growth and development of the law.

Membership in the *Journal* is the highest honor that can be attained by the student, being reserved for those who not only excel in their courses but also demonstrate capacity to do creative research and writing. Moreover, in the well-nigh universal judgment of the profession, the experience gained in this work provides the best training that the Law School has to offer. It should be the aim of every qualified student to take advantage of this opportunity.

### CORPORATE PRACTICE COMMENTATOR

The *Corporate Practice Commentator,* a quarterly periodical devoted to significant developments and new thinking in the field of corporation law and practice, is edited by Professor F. Hodge O'Neal. Although the *Commentator* is published by a commercial concern, it is assembled and manuscript is prepared in the School of Law under the direction of Professor O'Neal. The *Commentator* gives attention to matters of interest and importance to counselors and managers of corporate and other business enterprises. Primary emphasis is placed on corporation law and practice in the narrow sense, but a considerable amount of space is devoted to antitrust questions, labor matters, patents and copyrights, executives' compensation, fair trade legislation, and other matters arising out of business activities.

## *Organizations, Honors and Activities*

### THE DUKE BAR ASSOCIATION

The Duke Bar Association is the student governing organization of the Law School, and is organized along the lines of the American Bar Association. Its purpose is to introduce the student to the problems

considered by the Bar in professional organizations and to develop professional consciousness and responsibility.

The Duke Bar Association sponsors professional and social activities throughout the year. Dues are $15.00 per annum, payable in September.

## ORDER OF THE COIF

A chapter of the Order of the Coif, national legal scholarship society, has been established at Duke University School of Law. Its purpose is "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." Election is restricted to the ten per cent of the graduating class who have attained the highest rank in their law school work.

## MOOT COURT BOARD

A program of student Moot Court arguments is conducted under the supervision of the Moot Court Board as a part of the course in Research and Writing in which all first-year students are required to participate. In addition, a team of students is selected each year to represent the Law School in the National Moot Court competition.

## INTERNATIONAL LAW SOCIETY

Recognizing the importance of the role of law in international affairs, the Duke International Law Society provides a program for examining the application of international law to world problems. Through a series of lecture-discussions in the fall called "A Short Course in International Law" and by featuring distinguished speakers in the field throughout the year, the Society provides its members the opportunity to make contact with the men and ideas that are shaping the development of international law.

Other activities include participation in the annual Philip C. Jessup International Law Moot Court competition, attendance at conferences sponsored by the Association of Student International Law Societies, and entry into various writing contests.

Membership is open to all law students at $5.00 per annum.

## *Recreational Facilities*

The University is located about two miles from the business district of Durham on wooded hills constituting part of the five-thousand-acre Duke Forest, which is maintained by the School of Forestry. Within a short distance from the campus are facilities for golf, horseback riding and woodland hiking. Students of the Law School are entitled to the use of the University gymnasium, tennis courts, swimming pool, golf course, and similar privileges. Other opportunities for physical activity are available through the Intramural Program as well as through such activity groups as the outing club, sailing club, cycling club and the like. Skiing has been increasingly enjoyed by various groups. Several bowling alleys are available in and near Durham. Motion pictures are shown in Page Auditorium twice a week, and concert programs, recitals, lectures, and plays are presented frequently.

# Program of Instruction

## *First Year* (Required)

| | Semester Hours Fall | Spring |
|---|---|---|
| Business Associations I | | 3 |
| Chattel Transactions | 2 | |
| Civil Procedure | 3 | 3 |
| Contracts | 3 | 3 |
| Criminal Law & Procedure | 2 | 2 |
| Property I | 2 | 2 |
| Research & Writing | 1 | 1 |
| Torts | 3 | 2 |
| | 16 | 16 |

## *Second and Third Year*

In the absence of special authorization by the Dean, each student is required to take in each semester courses aggregating not less than 12 and not more than 16 hours.

The program in the second and third years is entirely elective. In planning his elective program, the student must bear in mind that certain courses are pre-requisites to other advanced courses:

Business Associations II is pre-requisite to the Seminars in Securities Regulation and Corporate Planning and Drafting.

Conflict of Laws is a pre-requisite to the Seminar in Conflict of Laws.

Evidence is pre-requisite to Trial Practice.

Federal Taxation I is a pre-requisite to Federal Taxation II and Federal Taxation III.

Federal Taxation I, Federal Taxation III, and Property II are pre-requisites to the Seminar in Tax and Estate Planning.

Labor Relations is pre-requisite to the Seminar in Labor Law.

Trade Regulation is pre-requisite to the Seminar in Public Regulation of Business.

Constitutional Law is pre-requisite to the Seminar in Civil Liberties and Rights.

The elective courses and seminars offered in the second and third years are:

| TITLE | SEMESTER HOURS Fall | Spring |
|---|---|---|
| Administrative Law | 3 | |
| Business Associations II | 2 | 2 |
| Conflict of Laws | 3 | |
| Debtors' Estates | 3 | |
| Equitable Remedies | 2 | |
| Evidence | 4 | |
| Family Law (not offered 1964-5) | 2 | |
| Federal Taxation III | 3 | |
| Insurance | 2 | |
| International Law | 3 | |
| Labor Relations | 3 | |
| Legal Accounting | 2 | |
| Legal Process | 3 | |
| Negotiable Instruments | 3 | |
| North Carolina Practice | 2 | |
| Patent Law (not offered 1964-5) | 2 | |
| Property II | 4 | |
| Securities Regulation | 3 | |
| Seminar in Criminal Law | 2 | |
| Seminar in Military Law | 2 | |
| Seminar in Urban Renewal | 1 | |
| Seminar in World Law | 3 | |
| Trade Regulation | 3 | |
| Admiralty | | 3 |
| Comparative Law | | 3 |
| Constitutional Law | | 4 |
| Federal Jurisdiction | | 2 |
| Federal Taxation I | | 3 |
| Federal Taxation II | | 3 |
| International Economic Relations (not offered 1964-5) | | 3 |
| Jurisprudence (not offered 1964-5) | | 3 |
| Legal History (not offered 1964-5) | | 2 |
| Legal Profession | | 1 |
| North Carolina Statutes | | 2 |
| Real Estate Transactions | | 3 |
| Sales | | 3 |
| Security | | 3 |
| Seminar in Civil Liberties and Civil Rights | | 2 |
| Seminar in Conflict of Laws | | 2 |
| Seminar in Corporate Planning and Drafting | | 2 |
| Seminar in Labor Law | | 2 |
| Seminar in Problems in Conflict of Laws | | 2 |
| Seminar in Regulated Industries | | 2 |
| Seminar in State and Local Government | | 2 |
| Seminar in Tax and Estate Planning (not offered 1964-5) | | 2 |
| Seminar in Workmen's Compensation | | 2 |
| Social Legislation | | 2 |
| Trial Practice | | 2 |
| Trusts | | 3 |

Individual research by students for credit, not exceeding three semester hours per year, will be permitted, subject to the approval and under the supervision of a faculty member.

# Description of Courses

## *Business Courses*

BUSINESS ASSOCIATIONS I. Legal principles concerning association in business by agency, partnership, other unincorporated forms and corporations. Creation, form and nature of agency, partnership and corporation, corporate existence (de facto corporations, corporate entity and its limitations), powers, duties, liabilities and compensation of agents, partners, officers and directors, risks in conduct of business by representatives (vicarious liability in tort, authority to contract), imputation of notice and knowledge, scope of enterprise (ultra vires), revocation and termination of authority, ratification, undisclosed business associates, stability of the associational relationship. The purpose of this course is to grasp basic principles of Agency and Partnership and introductory related principles of corporation law. (The main basic study of corporation law, however, is in Business Associations II.) Three hours a week second semester. MR. LATTY

BUSINESS ASSOCIATIONS II. Promoters, subscription to and issue of shares, stock structure and corporate capital, dividends, preferred stock, bonds, capital increases and reduction, corporate re-acquisition of own stock, elementary principles of corporate accounting, public issue of securities, stock transfers, fundamental corporate changes (recapitalization, sale, merger and consolidation, dissolution), stockholders' suits, and certain principles concerning management and operation not studied in Business Associations I. Two hours a week each semester. MR. O'NEAL

CONTRACTS. The formation and legal operation of contracts in general, with attention to problems of drafting and counseling as well as of litigation and extrajudicial settlement. Legal and equitable remedies in contract cases, including damages, specific performance, and restitutionary remedies, and important procedural devices incident to such remedies. Three hours a week throughout the year. MR. O'NEAL

SEMINAR IN CORPORATE PLANNING AND DRAFTING. The student is given hypothetical corporate problems (perhaps taken from the practicing lawyer's desk) on a client's proposed course of action; each problem is designed to require the student to grasp the business situation and goals involved, analyze for pertinent legal principles, plan the transaction to avoid legal business (including taxation) pitfalls, plan the requisite steps to consummate the desired transaction, draft the appropriate papers and present his research. Two hours a week second semester. MR. O'NEAL

DEBTORS' ESTATES. Comparative study of methods used for the liquidation of debtors' estates. The nonbankruptcy materials cover individual creditor's rights by attachment, garnishment, execution, creditors' bills and the like; common law composition; and general assignments. The bankruptcy materials cover, in the main, the first seven chapters of the Bankruptcy Act. Three hours a week first semester. MR. SHIMM

INSURANCE. The nature of "insurance"; government supervision and control; types of insurance organization; the legal requirement of insurable interest; interests of others than the named insured; the measure of indemnity; subrogation; the beneficiary's interest in life insurance; the insured event and excepted causes; warranties, representations and concealment; the making of insurance contracts; waiver, estoppel and election. Two hours a week first semester. MR. HAVIGHURST

INTERNATIONAL ECONOMIC RELATIONS. See Public Law Courses, page 35, for decription.

LEGAL ACCOUNTING. An examination and analysis of accounting principles and practices necessary for reasonably effective collaboration with accountants on problems requiring the work of both lawyers and accountants. The course is designed to develop in the student an understanding of how an accountant's work is used by top management in making decisions, by government in making and enforcing regulations, and by investors and lenders in exercising a discriminating choice in the employment of their funds. Two hours a week first semester.
MR. GRAHAM

NEGOTIABLE INSTRUMENTS. Study of the rules of the law merchant and the provisions of the Negotiable Instruments Law and the Uniform Commercial Code relating to the functions and legal incidents of checks, bills of exchange, promissory notes, and similar commercial instruments. Three hours a week first semester. MR. SHIMM

SALES. Study of the rules of the common law and the provisions of the various uniform acts and the Uniform Commercial Code relating to warranties, risks, remedies for breach, financing, and other legal problems arising in the sale of goods. Three hours a week second semester. MR. SHIMM

SEMINAR IN PUBLIC REGULATION OF BUSINESS. See Public Law Courses, page 36, for description.

SEMINAR IN SECURITIES REGULATION. See Public Law Courses, page 36, for description.

TRADE REGULATION. See Public Law Courses, page 37, for description.

## *Property Courses*

CHATTEL TRANSACTIONS. This course uses the field of Personal Property and the traditional title-passing rules of Sales to appraise judicial reasoning and legal concepts. It serves both as a low-level course in judicial methodology and an introduction to commercial law. It deals with possession and title of chattels, the bailment relationship, artisan's lien, transfer of chattels by gift and miscellaneous inter-vivos transactions. It does not go into details of enforcement of buyers' and sellers' rights or sales financing. Two hours a week first semester. MR. LATTY

PROPERTY I. The basic concepts of real property law and conveyancing. Historical background; estates in land, including the fee simple, the fee tail with its statutory substitutes, the life estate, the estate for years and other non-freeholds; concurrent ownership; types of future interests; conveyances before and after the Statutes of Uses; landlord and tenant; the modern deed—kinds, delivery, description, title covenants; covenants and agreements running with the land at law and in equity; easements; recording and title registration. Two hours a week throughout the year. MR. BOLICH

PROPERTY II. The various rules and concepts governing transmission of property from one generation to another, including the materials normally covered in the traditional courses on Wills and Future Interests. Historical background; intestate succession at common law and under modern statutes; limitations upon testamentary power; execution and revocation of wills; contest of wills; lapse, ademption and satisfaction; future interests, comprising reversions, remainders, executory interests, rights of entry, possibilities of reverter, and their incidents; class gifts; powers of appointment; rule against perpetuities and other restrictions on the creation of interests; construction of wills and deeds. Four hours a week first semester. MR. BOLICH

REAL ESTATE TRANSACTIONS. Aspects of real estate practice including land-use development through private devices involving restrictive covenants, easements, conditions and other concepts; public control by zoning and subdivision legislation; public-private developments such as urban renewal; and some special problems, including cooperative apartments and shopping centers. Three hours a week second semester. MR. BOLICH

SECURITY. Mortgage and security interests in real property, and suretyship. Three hours a week second semester. MR. SHIMM

SEMINAR IN TAX AND ESTATE PLANNING. Seminar devoted to problems and techniques of tax and estate planning. Enrollment limited. Two hours a week second semester. (Not offered in 1964-65.)

TRUSTS. The nature, creation and elements of a trust; character and transfer of the beneficiary's interest; charitable trusts; administration of trusts; termination and modification of trusts; liabilities to and of third persons; enforcement of trusts; and constructive and resulting trusts. Three hours a week second semester.
MR. JOHNSTON

## *Public Law Courses*

ADMINISTRATIVE LAW. The formulation of statutory schemes of administrative regulations: the organization of administrative agencies; the determination, promulgation and enforcement of administrative programs; the respective spheres of administrative and judicial responsibility; judicial control over administrative action. Practice and procedure before administrative agencies: informal conferences and negotiations; formal hearings; constitutional limitations. Three hours a week first semester. MR. MUNDHEIM

SEMINAR IN CIVIL LIBERTIES AND CIVIL RIGHTS. Studies in the field of personal liberties (freedom of speech, press, religion, association, etc.) and in the field of civil rights (right to non-discriminatory treatment, right to fairness in procedure, etc.). The seminar will be concerned with issues about which the law is unsettled, and especially with issues raised in cases pending before the Supreme Court of the United States. Two hours a week and second semester. MR. WALLACE

CONSTITUTIONAL LAW. Judicial protection against arbitrary governmental action; the history of the concept of a "higher law"; the constitutional clauses relied upon. Limitations on governmental power with respect of economic matters, civil liberties and criminal and civil procedure. The powers of Congress, express and from the exercise of Congressional powers. The constitutional questions involved implied; limitations on State governmental powers resulting from the existence and in administrative law, conflict of laws, intergovernmental tax immunities, jurisdiction to tax, and state taxation of interstate commerce are covered more fully in other courses. Four hours a week second semester. MR. WALLACE

CRIMINAL LAW AND PROCEDURE. An introductory study of the law of crimes and the administration of criminal justice; analysis of the criminal act and the mental element in crime; consideration of specific offenses as defined by statute and the common law; discussion of typical defenses in relation to specific crimes; study of the elements of Anglo-American criminal procedure. Two hours a week throughout the year. MR. LIVENGOOD

SEMINAR IN CRIMINAL LAW. Current problems in administering criminal justice, including studies of theory and technique in criminal procedure (investigation, prosecution and defense of criminal charges), inquiry into basic policy in the use of criminal sanctions for the promotion of public order, consideration of contemporary developments (legislative, judicial and administrative) in substantive and adjective criminal law, and analysis of specific problem areas such as mental responsibility, sexual deviation, attempts, and vicarious liability. Two hours a week first semester. MR. LIVENGOOD

FEDERAL JURISDICTION. A study of the federal courts with respect to the part played by them in achieving a workable federalism. Special attention will be given to the original jurisdiction of the federal district courts, the relationship of the federal courts to state courts and state law, and the permissible and desirable range of federal judicial power. Two hours a week second semester. MR. PASCHAL

FEDERAL TAXATION I. An introduction to federal taxation with emphasis on the federal income tax. The topics considered include such basic concepts of income taxation as taxable income, deductions, the taxable person, accounting for income and deductions, computation of the tax, and capital gains and losses. Three hours a week and second semester. MR. HAMBRICK

FEDERAL TAXATION II. A continuation of Federal Taxation I. Among the topics considered are the taxation of corporations and corporate distributions, corporate reorganizations and readjustments, the personal holding company surtax and the accumulated earnings tax, the taxation of partnerships, and of corporations electing to be taxed as partnerships. Three hours a week second semester.
MR. HAMBRICK

FEDERAL TAXATION III. The principal emphasis of the course is on the federal estate and gift taxes. Consideration is also given, however, to the related portions of the federal income tax dealing with the taxation of the income of estates and trusts and income in respect of a decedent. Three hours a week first semester. MR. JOHNSTON

INTERNATIONAL ECONOMIC RELATIONS. Legal framework of U. S. foreign trade and investment; foreign trade and investment laws of selected foreign countries; function of international economic law; international economic agreements; problems of foreign trade and investments. Three hours a week second semester. (Not offered in 1964-65.) MR. BAADE

INTERNATIONAL LAW. A survey of public international law of peace, as evidenced especially in decisions of national and of international courts; the drafting and interpretation of treaties; the nature of handling of international claims; the organization and jurisdiction of international tribunals, with special reference to the International Court of Justice; developments with respect to the codification of the law. Three hours a week first semester. MR. BAADE

LABOR RELATIONS. A study of the law relating to collective bargaining and concerted labor activities, including the National Labor Relations Act and related legislation, the legal aspects of strikes, boycotts and picketing, the negotiation and administration of collective bargaining agreements, procedures for the settlement of labor disputes, and relations between the union and individual employees. Three hours a week first semester. MR. LIVENGOOD

SEMINAR IN LABOR LAW. An intensive examination of significant problems in collective bargaining, union-management relations and labor dispute settlement, with emphasis upon the drafting and interpretation of contract clauses, theories and techniques in contract negotiation, grievance handling, voluntary arbitration and other procedures for the adjustment of disputes, and the inter-relation of the legal and economic aspects of labor problems. Two hours a week second semester.
MR. LIVENGOOD

SEMINAR IN MILITARY LAW. A study of military jurisdiction, the rights of military personnel, the body of both substantive and procedural law that has developed under the Uniform Code of Military Justice; in addition to its other goals, the seminar will seek to develop skills in statutory interpretation and to encourage comparisons between civilian and military criminal law administration. Two hours a week first semester. MR. EVERETT

SEMINAR IN REGULATED INDUSTRIES. Selected studies of government economic regulation in such regulated industries as transportation, broadcasting, and power, plus directed research and writing in specific problems of trade regulation. Two hours a week second semester. MR. HAVIGHURST

SEMINAR IN URBAN RENEWAL. A study of the urban renewal program, as implemented at the federal and local levels. Extensive field work is planned and urban renewal officials will meet with members of the seminar to discuss problems of implementing an urban renewal program. One hour a week first semester.
MR. EVERETT

SOCIAL LEGISLATION. Contemporary public welfare law, with emphasis on government regulation of conditions of employment, including the Fair Labor Standards Act and other wage-hour and child-labor statutes, unemployment insurance and other social security legislation, employers' liability and workmen's compensation acts, and related laws establishing minimum standards for the creation, continuance and termination of the employment relationship. In addition to

other objectives, the course will seek to develop skills in legislative advocacy and procedure, and in the drafting and interpretation of statutes. Two hours a week second semester. MR. LIVENGOOD

SEMINAR IN STATE AND LOCAL GOVERNMENT. State legislative creation and control of local governmental units, municipal police power, limitations on taxation, indebtedness, and expenditures of funds, bond issues, tort liability, annexation, eminent domain, subdivision regulation, public housing, and urban renewal. Considerable field work is planned. Two hours a week second semester. MR. EVERETT

SEMINAR IN TAX AND ESTATE PLANNING. See Property Courses, page 34, for description.

TRADE REGULATION. A study of the federal antitrust laws and their common law background, with emphasis on the economic policies involved, and of specific unfair trade practices and unlawful restraints at common law and under state and federal statutes. Attention is given to a critical examination of legislation designed to enforce competition as the primary control of the economic system; legal measures that supplement or replace competition; the relation of patents and antitrust; price discrimination; fair trade laws; regulation of advertising; trademarks and trade-names; appropriation of trade values; boycotts; and disparagement. Three hours a week first semester. MR. HAVIGHURST

SEMINAR IN WORKMEN'S COMPENSATION. The main elements of Workmen's Compensation Law of the United States are covered through the assignment of typical office problems on which legal memoranda or opinions are prepared. Two hours a week second semester. MR. LARSON

SEMINAR IN WORLD LAW. This is a discussion seminar open to students of the Law School and the Political Science Department, and to a limited number of other students with satisfactory backgrounds. The emphasis of this course is around those aspects of National law and International law which have an important influence on weakening or strengthening a world legal order. Detailed attention is given to the United States judicial decisions, other laws, and relevant policies effecting the relation of the United States to such a world legal system. Special attention is also given to decision of the International Court of Justice and to Constitutional treaties. The course will not duplicate the material in the regular course on International Law. Efforts are made through the seminar discussions to develop an adequate concept of world law. Three hours a week first semester. MR. LARSON

## *General Courses*

ADMIRALTY. The special body of law governing maritime affairs, especially the transportation of goods and passengers by water. Admiralty jurisdiction; marine insurance; carriage of goods; charter parties; general average; rights of injured seamen and others; collision; salvage; maritime liens and ship mortgages; limitation of liability; governmental activity in shipping. Three hours a week second semester. MR. CURRIE

COMPARATIVE LAW. An examination and comparison of the law of selected jurisdictions on certain specific topics. The history, sources, and methods of the civil law will be investigated, discussed, and compared with those of common law countries. Three hours a week, second semester. MR. BAADE

CONFLICT OF LAWS. A study of the special problems which arise when the significant facts of a case are connected with more than one jurisdiction. Recognition and effect of foreign judgments; choice of law; federal courts and conflict of laws; the United States Constitution and conflict of laws. Three hours a week first semester. MR. CURRIE

EQUITABLE REMEDIES. A survey of equitable remedies in general (including enforcement of equity decrees) and of important parts of the fields of equity

and restitution that are not covered in other courses. Two hours a week first semester. MR. PASCHAL

FAMILY LAW. Marriage; annulment; divorce; separation; property rights. Two hours a week first semester. (Not offered in 1964-65.) MR. BAADE

JURISPRUDENCE. Discussion of some of the basic problems of classical and contemporary juristic theory, with applications to cases and statutes. Open to all graduate students, and, with the consent of the instructor, to qualified second and third year students. Three hours a week second semester. (Not offered in 1964-65.) MR. HARDIN

LEGAL HISTORY. A study of the development of fundamental English and American legal institutions, with primary emphasis upon the establishment and growth of American law from the colonial period to the present. Two hours a week second semester. (Not offered in 1964-65.)

THE LEGAL PROCESS. A study of problems in the making and application of law and of the institutions for solving those problems. This has been called a course in "working jurisprudence." It deals with major jurisprudential concepts, not in the abstract but in an attempt to put them to work in the solution of specific legal problems. The problems cut across conventional course lines and include not only those confronted by courts, but also those confronted by private persons and their counsel, legislatures, administrative agencies, public officials, and others. Three hours a week first semester. MR. CURRIE

NORTH CAROLINA STATUTES AND DECISIONS. A study of selected statutes of North Carolina with discussion of their application, and an analysis of the decisions of the Supreme Court of North Carolina construing them. Two hours a week second semester. MR. BRYSON

PATENT LAW. A short survey of the law relating to patents and trademarks, with some coverage of copyrights, primarily to give the general practitioner a foundation in these areas to collaborate effectively with specialists. Special attention is given to overlapping problems in above-mentioned areas. One hour a week first semester. (Not offered in 1964-65.)

SEMINAR IN THE CONFLICT OF LAWS. Advanced study of selected problems in the conflict of laws. Research paper required. Two hours a week second semester. MR. CURRIE

TORTS. The bases of liability in damages for personal injuries and injuries to property; bases other than fault; negligence; intentional infliction of harm. Procedure in jury trials; proof of negligence; causation and "proximate cause"; defenses. Special rules applicable to occupiers and owners of land, motor vehicle accidents, suppliers of goods and remote contractors. Misrepresentation and fraud; defamation; assault and battery; false imprisonment. Three hours a week first semester, two hours a week second semester. MR. HARDIN

## *Procedure and Practice Courses*

CIVIL PROCEDURE. A study of the adjudication of civil cases with special emphasis on the Federal Rules of Civil Procedure. Three hours a week throughout the year. MR. PASCHAL

EVIDENCE. A study of the common-law rules of evidence, including the requirements of relevancy and materiality; competency and privilege of witnesses, examination and cross-examination, burden of proof and presumptions, judicial notice, and functions of judge and jury. Four hours a week first semester. MR. HARDIN

LEGAL PROFESSION. Lectures, discussions, and reading concerning the ethical problems and professional responsibilities of the lawyer. One hour a week second semester. MR. HARDIN

NORTH CAROLINA PRACTICE. A study of the steps in a civil action at law from the issuance of process to the entry of final judgment including service of process; appearance and waiver of process; selecting the jury; various motions made during the trial; submission of case to jury; verdict; judgment; noting and perfect-

ing appeal. Also included are such topics as jurisdiction of various courts in North Carolina; venue; trials without a jury; provisional remedies and special proceedings. Two hours a week first semester. MR. BRYSON

TRIAL PRACTICE. A study of the function of the advocate in the trial of law suits, with emphasis upon methods of pre-trial preparation and development of facts in court, typical uses of rules of procedural and substantive law in trial proceedings, and tactical and ethical aspects of problems which confront the trial lawyer. The course is open to third-year students who have completed the course in Evidence. Two hours a week second semester. MR. HARDIN

## *Legal Research and Writing*

DUKE LAW JOURNAL. One semester-hour of credit shall be accorded for each semester of satisfactory *Law Journal* activity as a competitor or as a member of the Editorial Board other than an officer; two semester-hours of credit shall be accorded for each semester of satisfactory *Law Journal* activity as an officer of the Editorial Board.

RESEARCH AND WRITING. Classroom instruction and individual problems in the use of law books, the preparation of memorandum of law, and moot court briefing and argument. Two semester-hours credit. MR. JOHNSTON

Upon recommendation of the Committee on Graduate Study, seminars not listed in the Bulletin may be created or arrangements made for supervision of special research by individual graduate students in any subject.

All matters presented in this Bulletin are subject to change as the University or the School of Law may deem expedient.

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# ENROLLMENT 1963-1964

## *First Year*

Adelson, Andrew E. (Washington and Lee University), Baltimore, Maryland
Albert, Burton L. (Dartmouth College), Sioux City, Iowa
Allen, Richard M. (Purdue University), Park Ridge, Illinois
Alsentzer, William J. (Duke University), Wilmington, Delaware
Anderson, Bruce H. (Duke University), Thomasville, Georgia
Axelrod, Charles D. (Colgate University), Bellmore, New York
Bader, W. Reece (Williams College), Portland, Oregon
Baier, Alan L. (Williams College), Bellport, New York
Benson, George J. (Lafayette College), New Shrewsbury, New Jersey
Blanco, David B. (Duke University), Winston-Salem, North Carolina
Branch, Barrington H. (Davidson College), Atlanta, Georgia
Brooks, Earle L. (Miami University), Columbus, Ohio
Buhrman, Richard W. (University of Chattanooga), Chattanooga, Tennessee
Burchyns, Peter S. (Boston College), Rosedale, New York
Cabe, Robert D. (Hendrix College), Benton, Arkansas
Cairns, John A. (Carleton College), Greenville, Delaware
Carson, J. Van (Mount Union College), Canton, Ohio
Cawood, Harry E. (Wheaton College), Newton, Iowa
Connard, Carroll S. (Williams College), New Hope, Pennsylvania
Conroy, Dale D. (Duke University), Bethpage, New York
Courter, James A. (Colgate University), Essex Falls, New Jersey
Davis, R. Kennedy (Ohio Wesleyan University), Findlay, Ohio
Denson, Alexander B. (North Carolina State College), Richmond, Virginia
Detrick, Judson W. (DePauw University), LaGrange, Illinois
Etz, Winton O., Jr. (Miami University), Xenia, Ohio
Evans, John E. (University of Louisville), Wyomissing, Pennsylvania
Feinstein, Miles R. (Rutgers University), Camden, New Jersey
Field, Michael W. (Georgetown University), Washington, D.C.
Fink, Jerold A. (Duke University), Dayton, Ohio
Fowlkes, Hal T., Jr. (Millsaps College), Wiggins, Mississippi
Fox, Henry H. (Florida State University), Miami, Florida
Ganotis, John (Syracuse University), Jamesville, New York
Gaskins, Eura DuVal, Jr. (Wake Forest College), Monroe, North Carolina
George, Robert M. (North Carolina State College), Mercer Island, Washington
Gilley, Dewey C., Jr. (Davidson College), Leaksville, North Carolina
Gold, Peter S. (Duke University), Shelby, North Carolina

Goss, Stanley B. (University of Denver), Aurora, Colorado
Gram, J. Theodore (Hamilton College), Olean, New York
Haddon, Harold A. (Albion College), Fenton, Michigan
Harriett, George M., Jr. (Florida State University), Sanford, Florida
Harrington, Anthony S. (University of North Carolina), Charlotte, North Carolina
Harriss, William G. (University of North Carolina), Burlington, North Carolina
Hart, William J. (Drury College), Republic, Missouri
Hawke, Russell J., Jr. (Drew University), Endwell, New York
Hayes, L. Mifflin (Kenyon College), Rahway, New Jersey
Hedden, Andrew S. (Hamilton College), Short Hills, New Jersey
Heiser, Lawrence C. (University of Southern California), Santa Monica, California
Hole, Allen D., III (Earlham College), Richmond, Indiana
Holmes, William K. (Augustana College), Wataga, Illinois
Horsch, Christopher J. (University of the South), Newnan, Georgia
House, Donald R. (Duke University), Monroe, North Carolina
Howe, Jonathan T. (Northwestern University) Des Plaines, Illinois
Huber, John L. (Dartmouth College), Pittsburgh, Pennsylvania
Huston, Michael B. (Oberlin College), Kalamazoo, Michigan
Hutton, E. Jeremy (Colgate University), Hillsdale, New Jersey
Jacobson, James C. (Emory College), Miami Beach, Florida
Johnson, William L., Jr. (Duke University), Mt. Gilead, North Carolina
Jones, Marshall R., Jr. (University of Nebraska), Lincoln, Nebraska
Keating, Robert G. M. (Georgetown University), Brooklyn, New York
Lee, Peter J. (Washington and Lee University), Pensacola, Florida
Lewis, F. Sherwood (Duke University), Falls Church, Virginia
Long, Don B. Jr. (Columbia University), Roanoke, Alabama
Lynch, Michael F. (Notre Dame University), Atlanta, Georgia
McCaughan, Ralph L. (Duke University), Fort Lauderdale, Florida
McClatchey, Devereaux F. (Brown University), Atlanta, Georgia
McCoy, Jerry J. (West Virginia University), Parkersburg, West Virginia
McDonald, Daniel M. (Brown University), Fall River, Massachusetts
Maloy, Michael J. (Cornell University), Allentown, Pennsylvania
Maxwell, James B. (Randolph-Macon College), Newport News, Virginia
Michel, Peter J. (St. Francis College), Bronx, New York
Miller, Michael L. (Ohio University), Miamisburg, Ohio
Miller, Steven L. (Yale University), Sioux City, Iowa
Moore, Roy W. (Harvard University), Fairfield, Connecticut
Morgan, Thomas H. (Duke University), Garden City, New York
Morris, Joel J. (Duke University), Raleigh, North Carolina
Noble, David D. (College of Wooster), Wooster, Ohio
Nurkin, Sidney J. (Duke University), Durham, North Carolina
Ort, Richard H. (Connecticut Wesleyan University), Chatham, New Jersey
Paddock, Ben L. (University of the South), Fort Smith, Arkansas
Palmer, Richard A. (Yale University), Wethersfield, Connecticut
Palmer, Warren M. (Hamilton College), Utica, New York
Perry, Spence W. (Harvard University), Jacksonville, Florida
Peters, David F. (Washington and Lee University), Hagerstown, Maryland
Phillips, T. Stephen (DePauw University), Tennyson, Indiana
Pitcher, Thomas B. (University of Florida), Tombstone, Arizona
Porter, T. William (Southern Methodist University), Bellaire, Texas
Richards, Channing O. (University of North Carolina), Charlotte, North Carolina
Rickards, Edward S. (Duke University), Milltown, New Jersey
Robin, Edward B. (University of Florida), Jacksonville, Florida
Roos, Robert C. (Wabash College), Elmwood Park, Illinois
Schlegel, H. James (Mount Union College), South Mountain, Pennsylvania
Scott, Robert H., Jr. (Kenyon College), Prairie Village, Kansas
Semonche, John (Brown University), Chapel Hill, North Carolina
Shaw, Peter L. (Northwestern University), Webster Groves, Missouri
Smith, Richard A. (Colgate University), Syracuse, New York
Snodgrass, Richard A. (Yale University), Erie, Pennsylvania
Snow, Armil L. (University of Arkansas), Fayetteville, Arkansas
Spangler, Robert W. (Pennsylvania State University), McKeesport, Pennsylvania
Story, Joseph A. (Miami University), Hamilton, Ohio
Thomson, Richard W. (St. Lawrence University), Oakdale, New York
Varner, K. Morgan (Princeton University), Auburn, Alabama
Wehrle, Richard T. (Duke University), Charlotte, North Carolina
Wheeler, Douglas P. (Hamilton College), Huntington, New York
Whitman, Dale A. (Brigham Young University), Charleston, West Virginia
Wies, Thomas N. (Yale University), Branford, Connecticut
Willard, William G., III (Princeton University), Spartanburg, South Carolina
Williams, Neil C., Jr. (Duke University), Asheboro, North Carolina
Woodcock, Donald F. (Kent State University), Akron, Ohio
Yarrington, S. Christine (Millikin University), Keokuk, Iowa

## *Second Year*

Addlestone, David F. (University of North Carolina), Sumter, South Carolina
Aiesi, Donald P. (Stetson University), Reading, Massachusetts
Alder, Jonathan (Princeton University), Chester, West Virginia
Archie, Peter B. (University of North Carolina), Kinston, North Carolina

Bacsak, Peter (Princeton University), New York, New York
Bateman, Charles L. (Elon College), Burlington, North Carolina
Berner, Robert (DePauw University), Ticonderoga, New York
Bogle, Robert A. (Brown University), Fall River, Massachusetts
Brannen, George (Dartmouth College), Geneva, Illinois
Breazeale, Francis I. (Pennsylvania State University), Hendersonville, North Carolina
Brigati, Joseph J. (Notre Dame University), Syracuse, New York
Briggs, Michael G. (Alabama Methodist University), Anchorage, Alaska
Brown, Peter O. (Amherst College), Ithaca, New York
Burleigh, Reginald E. (Bowdoin College), Caribou, Maine
Campbell, Charles G. (Albion College), Adrian, Michigan
Carpenter, Randle B. (Duke University), Raleigh, North Carolina
Cartwright, Thomas C. (University of North Carolina), Durham, North Carolina
Clark, Thomas B. (University of Rochester), Lexington, Kentucky
Cohen, David (Brooklyn University), Brooklyn, New York
Coughlan, Patrick C. (Duke University), Boca Raton, Florida
Crenshaw, Kerry (The Citadel), Anderson, South Carolina
Curtis, William M. (Wesleyan University), Valley Stream, New York
Dansby, Gerald D. (Rice University), Riverside, California
Detweiler, Robert E. (Lafayette University), Easton, Pennsylvania
Edgar, Robert A. (Davidson College), Athens, Tennessee
Edmonds, Thomas A. (Mississippi College), Jackson, Mississippi
Ervin, Paul R., Jr. (Duke University), Charlotte, North Carolina
Farr, Samuel W. (Syracuse University), Big Flats, New York
Gardiner, Donald B. (DePauw University), Cedar Rapids, Iowa
Garrenger, Robert L., Jr. (University of Pennsylvania), Plainfield, New Jersey
Gerde, Jerome W. (University of Indiana), Crown Point, Indiana
Gilchrist, Peter S. (University of North Carolina), Chapel Hill, North Carolina
Graves, Thomas W., Jr. (Duke University), Wilson, North Carolina
Hickey, James C. (Vanderbilt University), Hopkinville, Kentucky
Hines, John M. (Duke University), Durham, North Carolina
Hjelmfelt, David C. (Kansas State University), Shawnee, Kansas
Hughes, Jeffrey P. (Wesleyan University), Jenkintown, Pennsylvania
Hunger, Frank W. (University of Mississippi), Winona, Mississippi
King, William D. (Duke University), Hueytown, Alabama
Kleinschmidt, Thomas C. (Westminster College), Clayton, Missouri
Klute, Lawrence W. (Grinnell College), Three Oaks, Michigan
Lougee, David L. (Bates College), Shrewsbury, Massachusetts
McEwen, Bruce (Carlton College), Riverside, Illinois
McGeary, Raymond T. (Muskingum College), Cheswick, Pennsylvania
MacPhail, Douglas F. (Dartmouth College), Englewood Cliffs, New Jersey
Marquardt, Emil C. (Notre Dame University), Clearwater Beach, Florida
Matthies, Eric F. (Dartmouth College), Fort Lauderdale, Florida
Meehan, Thomas P. (Middlebury College), North Bergen, New Jersey
Memory, Thomas (North Carolina State University), South Bend, Indiana
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Miller, Roy E. (Bradley University), Silvis, Illinois
Mills, Charles B. (Ohio Wesleyan University), Marysville, Ohio
Morgan, Richard M. (Davidson College), Hamlet, North Carolina
Moyer, Jay E. (Dartmouth College), Washington, D.C.
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Noelke, Walter D. (University of the South), Dallas, Texas
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Peyton, Gordon P. (University of the South), Durham, North Carolina
Piper, James P. (Rice University), Houston, Texas
Prather, Mark D. (Duke University), Meadville, Pennsylvania
Rankin, Robert (Duke University), Durham, North Carolina
Reid, Eben L. (Davidson College), Columbus, Georgia
Rufe, John J. (Lafayette College), Sellersville, Pennsylvania
Seeber, Ronald G. (Hamilton College), Elmira, New York
Shailer, Philip S. (Yale University), New York, New York
Sims, Edgar H. (Davidson College), Toccoa, Georgia
Sink, Robert C. (Duke University), Raleigh, North Carolina
Smith, Edwin W. (Auburn University), Auburn, Alabama
Smith, Gibson L. (Davidson College), Charlotte, North Carolina
Smith, Spencer B. (College of Wooster), Camp Hill, Pennsylvania
Smyth, Ross J. (Davidson College), Charlotte, North Carolina
Speer, William (Duke University), Charlotte, North Carolina
Stanton, Robert (Colgate University), Williamson, New York
Stevenson, Ward B. (Duke University), Durham, North Carolina
Stokes, James C. (Duke University), Salisbury, North Carolina
Strickland, Carter (Dartmouth College), Oneida, New York
Unterman, Edan G. (Princeton University), Rockville Centre, New York
Vincent, Richard H. (Duke University), Orange Park, Florida
Ward, Craig B. (Rollins College), Winter Park, Florida
Warren, Joseph (Duke University), Sarasota, Florida
Watson, Wade T. (University of West Virginia), Gary, West Virginia

Windover, Fred (Brown University), Durham, North Carolina
Young, Robert E. (Duke University), Towson, Maryland

## *Third Year*

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Armstrong, Theodore Morelock (Yale University), Richmond, Virginia
Armstrong, William Bacon (Davidson College), High Point, North Carolina
Barrett, Frederick Gould (University of Michigan), Kenmore, New York
Beal, Jay Edwin (Duke University), Wethersfield, Connecticut
Beard, Robert Leroy (Duke University), Fayetteville, North Carolina
Bell, Samuel Paris (Dartmouth College), Daytona Beach, Florida
Bertrand, Bobby Joe (University of the South), Pulaski, Tennessee
Biehn, Kenneth G. (Lafayette College), Quakertown, Pennsylvania
Bond, Jay Darwin, Jr. (University of Richmond), Arlington, Virginia
Boudreau, Girard Edgar, Jr. (University of North Carolina), North Augusta, South Carolina
Bourns, Courtney Beach (Tufts University), Wooster, Ohio
Bowen, Patrick Harvey (Marietta College), Old Greenwich, Connecticut
Boyd, David John (Wabash College), Springfield, Illinois
Buchan, Burton Frederick (Valparaiso University), Charlotte, North Carolina
Buice, William Thomas (Washington and Lee University), Charlotte, North Carolina
Burgin, Charles Edward (University of North Carolina), Marion, North Carolina
Butler, Paul Mulholland, Jr. (University of Notre Dame), South Bend, Indiana
Carlyle, John Charles (Albion College), Plainwell, Michigan
Craig, Lewis Clifford (Duke University), Blanchester, Ohio
Crawford, Stephen Gregory (Duke University), Asheville, North Carolina
Dawson, Clyde William, Jr. (Ohio University), Columbus, Ohio
Dent, Dewitt Ronald (The Citadel), Augusta, Georgia
Drummond, Robert Kendig (College of Wooster), Wooster, Ohio
Edwards, David Nesbit, Jr. (Davidson College), Winston-Salem, North Carolina
Elster, John Robert (The Rice Institute), Houston, Texas
Finn, Charles Marvin (Hamilton College), Bellport, New York
Flanigan, John Franklin (University of Notre Dame), Fort Lauderdale, Florida
Flodin, Harvey Curtis (Beloit College), Oak Park, Illinois
Fryer, Robert Hirst (University of New Hampshire), Newton Junction, New Hampshire
Fuller, Walter Erwin, Jr. (University of North Carolina), Raleigh, North Carolina
Gaede, Anton Henry, Jr. (Yale University), Charlotte, North Carolina
Gary, Donald Arthur (Manhattan College), New York, New York
Grigg, David Lee (University of North Carolina), Albemarle, North Carolina
Grigsby, Lonnie Oscar (Duke University), Cadiz, Kentucky
Hadley, James Frederick (University of Michigan), Pioneer, Ohio
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Hirsch, William Albert (University of Kansas), Washington, Kansas
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Kale, Thomas Swain (Duke University), Durham, North Carolina
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Kohn, Arnold Joel (Duke University), Merrick, New York.
Kola, Arthur Anthony (Dartmouth College), New Brunswick, New Jersey
Lacy, Graham Gordon, Jr. (Davidson College), Washington, District of Columbia
Leech, John Dale (Williams College), Cleveland, Ohio
MacKinlay, James Kent (University of Alberta), Calgary, Alberta
Mazeau, Robert George (Columbia College), Lyndhurst, New Jersey
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Pancoast, Howard Roger, Jr. (Davidson College), High Point, North Carolina
Payson, Robert Kendall (Duke University), Wilmington, Delaware
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Pyper, Walter Wood, Jr. (Princeton University), Council Bluffs, Iowa
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Sauber, Anthony Frank (Duke University), Bethesda, Maryland
Shoun, Robert Earl (Randolph Macon College), Petersburg, Virginia
Sims, William Thomas (Stetson University), York, Pennsylvania
Spearman, William Lewis, Jr. (The Citadel), Columbia, South Carolina
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Ulle, Albin Edward (Miami University), Fairport Harbor, Ohio
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## Law and Contemporary Problems

DUKE STATION DURHAM, N. C.

# ACADEMIC GUIDE FOR DUKE FRESHMEN

**Bulletin of Duke University**

**Volume 36 Number 6-C April, 1964**

# BULLETIN

# OF

# DUKE UNIVERSITY




THE UNDERGRADUATE COLLEGES

TRINITY COLLEGE
THE WOMAN'S COLLEGE
THE COLLEGE OF ENGINEERING

ACADEMIC GUIDE FOR DUKE FRESHMEN
1964-1965

DURHAM, NORTH CAROLINA
1964

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Note: *The last sheets of this booklet and the supplement inserted inside the back cover REQUIRE ATTENTION PRIOR TO JUNE 15.*


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# INTRODUCTION

This brochure is designed for all newly-admitted students of the Undergraduate Colleges of Duke University. It serves multiple purposes. It seeks to present relevant information on the freshman academic calendar, advanced placement, and the freshman program of study; to express the philosophy of the general academic requirements of the Undergraduate Colleges; to provide through reasoned statements the rationale, the depth, and the breadth of the individual departmental courses designed for freshmen; to suggest the scope and coverage of the major subject concentration in the studies beyond the freshman year. Finally, the booklet seeks to communicate a sense of the importance, urgency, or excitement inherent in the courses and disciplines which contribute to the training of the searching mind.

It is imperative for each entering student to become thoroughly familiar with the contents of this *Guide* and to give serious attention to his program of study for the freshman year. The tear sheets at the end of this booklet are provided for this purpose and they must be completed and mailed according to instructions on that page. Although class assignments and a schedule will be made for each student on the basis of course selections indicated on the tear sheets, it should be understood that changes may be made on final registration day within Freshman Week in response to in-residence counseling and the results of Duke placement tests. *The Bulletin of Undergraduate Instruction* will be of considerable help for specific course descriptions which may be referred to in this booklet merely by numbers and title, and for requirements, prerequisites, and other details extremely useful for every new student.

On the threshold of college, many students will have formed certain preconceived notions of what they expect to meet in their academic work. In general they will expect that their courses will be more demanding of time and of thought than were their preparatory courses. They may also expect to find a different approach, a different philosophy of learning and of values, since the primary and continuing function of university education is to assure maximum training and development of the intellectual powers of the student. Basic to this concern is our faith in the power of a liberal education to provide a foundation for the cultivation of leadership in both the

specialist and the generalist. To realize his hopes and to satisfy his needs, the Duke student will require acquaintanceship with his own heritage and tools with which to work. Having these, he may hopefully advance toward the discovery and development of his highest talents. This is the crux of the educational process, both for the individual as individual and as citizen. Duke believes that the greatest contribution to society can be expected from the highest development of the individual.

There is, of course, no royal road to learning, no one way but many through which excellence is achieved. Easy courses and easy standards are not among them. Students must be expected to develop initiative and to assume responsibility—under the best guidance and direction possible in the University—for developing effective habits of reading and self-study, for organizing well a body of factual information and of drawing valid conclusions from such a body of knowledge, for dealing effectively with the intellectual content of a subject and its area, in short, for developing an intellectual and moral integrity characteristic of the best and most fruitful kind of leadership in a democracy.

In moving toward these high goals, the Duke student has available a program of study that provides a basic breadth of learning in several disciplines and a deepening concentration upon his chosen specialty. Available to him in each academic department is a director of undergraduate studies who will advise him concerning major requirements and other details of his work, and a faculty adviser stands ready to provide the intellectual stimulus possible between coworkers in the exciting adventure of learning.

## FRESHMAN ACADEMIC CALENDAR

| | |
|---|---|
| *Bulletin of Undergraduate Instruction and Academic Guide for Duke Freshmen* mailed to Freshmen | May |
| "Registration Form Tear Sheets" and "Information Sheet for Faculty Adviser" mailed by Freshmen to Admissions Office | (Prior to June 15) |
| *Freshman Week* booklet mailed to Freshmen | August |
| Freshman Week begins | September 17 |
| Fall semester classes begin | September 24 |
| Six-weeks grade reports due from instructors | November 7 |
| Conferences on courses and pre-registration for the spring semester | November 16-19 |
| Final Examination Period | January 19-29, 1965 |
| Spring semester classes begin | February 2 |
| Six-weeks grade reports due from instructors | March 17 |
| Selection of a major (optional except for College of Engineering) | March |
| Conferences on courses of study and pre-registration for coming fall term | April 6-9 |
| Honors Convocation, Undergraduate Colleges | April |
| Final Examination Period | May 22-June 2 |

## ACADEMIC REQUIREMENTS

A liberal education includes breadth as well as depth of intellectual training and development. In terms of breadth the University believes that each student should acquire the use of at least two of the three fundamental tools of civilized life: *English, mathematics,* and a *foreign language.* In addition he should be introduced in some detail to the way the scientist operates in one or more fields: *physics, chemistry, zoology, botany,* or *geology.* Each student should also gain a clearer understanding of the *religion* of western civilization. He ought to be introduced to the modes of appreciating *literature, art, music,* or *philosophy.* Moreover, he should know something about man and his relationship to society through one or two of the following areas: *economics, history, political science, philosophy of education, psychology,* or *sociology.* Finally, as a complement to the academic program, he ought to be involved in *physical education* since physical fitness is desirable for a person engaged in intellectual endeavor. To this end a program of distribution is prescribed for each student. The *Bulletin of Undergraduate Instruction* gives the details of these uniform requirements for each type of degree.

This desirable breadth must be complemented by the depth and concentration of a major, i.e., a program of advanced study in a particular subject, such as history, English, or chemistry, and related study in appropriate allied fields. The University believes that a disciplined, intensive, and thorough approach to knowledge is essential for the educated person. Only through concentrated study can one begin to master a field, perceive its unique character, appreciate its contributions to human knowledge, and grasp its methods as well as its limitations. Perhaps the most important value of rigorous study in a single discipline is its impetus toward life-long self-education.

## THE FRESHMAN PROGRAM OF STUDY

Each student must write a program of study and submit it by mail according to instructions by June 15 (see pages 59, 61).

In carrying forward planning, one should refer to the *Bulletin of Undergraduate Instruction* for (1) a description of general requirements in each undergraduate college or school, (2) the work constituting a major in each discipline, and (3) the requirements in preprofessional areas. Although all cannot be accomplished in the freshman year, it may be important to include a course that is prerequisite to a sequence of courses within a particular major or program of study. Students who have not yet found a field of greatest interest will want to include one or more courses that may be helpful in choosing a major field of interest at a later date.

Further, in selecting courses, a student may wish to consider the possibility of his qualifications for a special section in a particular area of interest. As will be noted, these sections are available to qualified students in chemistry, English, history, mathematics, political science, and religion. Some of these special sections are designated by the letter *X*. Since special sections are rigorous and demanding in time of preparation, it is not advisable to register for more than one such course.

A representative freshman program of study consists of a distribution of courses including English and physical education. It is generally wise to include a foreign language and a laboratory science and at least one other course that may satisfy a requirement. A program of study should not exceed 18 hours or fall below 15 hours.

### REPRESENTATIVE PROGRAM

| *Course* | *Semester Hours* | |
|---|---|---|
| | *Fall Semester* | *Spring Semester* |
| English | 3 | 3 |
| Foreign Language | 4 (or 3) | 4 (or 3) |
| Laboratory Science | 4 | 4 |
| One or two others (requirements or electives) | 3 (or 6) | 3 (or 6) |
| Physical Education | 1 | 1 |
| Total (minimum and maximum limits) | 15-18 | 15-18 |

*EXCEPTIONS:*

1. Engineering students will take Math 21, 22 in place of a foreign language and Engineering 1-2 in place of one of the uniform requirements.

2. Some students strongly interested in the humanities and social science may wish to postpone the laboratory science until the second year.

3. Pre-medical students will generally take Math 21, 22 as a uniform requirement and, in some cases, a second laboratory science.

4. Where a course program totals as much as 19 s.h., however, one course should be deferred to the second year.

## ADVANCED PLACEMENT

The specific content of a student's freshman program is determined, in part, by the *level* of course placement he achieves. (This is readily seen in Chemistry 1 and Physics 41 where course enrollment is contingent upon the student's eligibility for Mathematics 17 or 21) Accordingly, entering students may achieve advanced placement in many of the fields listed in this brochure through three routes:

(1) CEEB *Advanced Placement Examinations* (in botany, chemistry, French, German, history, mathematics, physics, Spanish, and zoology). Students who have taken one or more Advanced Placement Examinations will be notified by letter prior to the beginning of fall semester classes whether they have earned advanced placement.

(2) CEEB *Achievement Tests* (in foreign language and mathematics). Students will receive notification of their course placement at an early assembly in Freshman Week. Whether or not a student elects to take at Duke a subject in which he has received advanced placement is, naturally, his own decision.

(3) DUKE *Freshman Week Placement Tests.* A student who has not taken a CEEB Achievement Test in mathematics or one in a particular foreign language, and who desires to continue at Duke work in these specific areas, will have the opportunity to qualify for advanced placement on the basis of tests administered during Freshman Week.

Students entering Trinity College or the Woman's College will either continue work in a foreign language at the assigned placement level or will begin another language at the elementary level. Students who are assigned to foreign language numbered 91-92 and who have confidence in their ability to understand the spoken language (does not apply to Greek or Latin) are urged to discuss with the appropriate Director of Undergraduate Studies the possibility of placement in a course at the 100-level.

The mathematics placement test establishes whether a student is qualified for Mathematics 17, 21, or 41. Freshmen who believe they are eligible for placement beyond Mathematics 41 on the basis of having had one or more courses in introductory calculus in secondary school and who have not taken the CEEB Advanced Place-

ment Test in mathematics are invited to see the Supervisor of Freshman Instruction in Mathematics early in Freshman Week.

Freshmen who anticipate taking the Duke Freshman Week placement tests and who expect to enter economics, business administration or accounting, engineering, pre-medical or pre-dental, mathematics, or science fields are advised to review their secondary school mathematics, particularly algebra (e.g., factoring, fractions, linear equations in one, two, and three unknowns, functions and graphs, exponents, and radicals, and elements of quadratic equations) in order to qualify for Mathematics 21 or Mathematics 17.

In the area of foreign languages, a student who is reviewing for the Duke placement test in French, German, Russian, or Spanish should know that these tests are the CEEB type with two distinct parts:

1. A section on reading comprehension. A student may prepare for this by extensive rapid reading. He should strive for general comprehension rather than translation.
2. A test of basic grammar. A student may prepare for this section by a review of basic grammar with particular attention to regular and irregular verbs.

Finally, inasmuch as a physical performance test (see Physical Education, pages 22, 23) is administered at the inception of the fall semester, the student is well-advised to condition himself for this activity prior to Freshman Week.

# FRESHMAN COURSES

Expanded descriptions of courses open to all freshmen in their first semester are provided in this section. Students selected for the Air Force or Naval ROTC programs take additionally a core of specialized work, not described in this bulletin, provided by the respective service.

Courses numbered 50 or above are open to first semester freshmen only via advanced placement. Exceptions are English 51, which is open in the fall to all freshmen, Economics 57 and Geology 51, which are open in the fall to freshmen with SAT verbal and mathematics scores of 600 or higher, and Psychology 91 and Sociology 91 and 92, which are open in the spring semester to all freshmen.

## ART

### 1-2, Introduction to Art History; 1L-2L, Design Laboratory

Art 1-2 serves as a general introduction to studies in archaeology, art history, and criticism. Emphasis is placed on the chronological development of architecture, sculpture, painting, and minor arts as material manifestations of the culture of Western man from ancient to modern times. In addition to revealing cultural history, the course introduces the student to principles and terminology related to form, materials, and techniques in the visual arts and develops within the student some insight for critical judgment and discrimination of works of art. Although Art 1-2 is not prerequisite to upper-level courses, the orientation it provides would be helpful in further art studies.

Art 1L-2L is a studio course which meets once a week during two semesters. It is an introduction to painting and drawing as developed through experiment and experience in such matters as form, line, and color. Various media are used, and no previous art training is required. Experienced students, on the other hand, will receive an orientation in the general philosophy of the studio program. The course is prerequisite to all other studio courses. A student contemplating secondary art education certification for teaching should take 1L-2L in the first year. When a student elects Art 1L-2L, he should take Art 1-2 concurrently.

## BOTANY

### 1, 2, General Botany

Botany is plant biology. The one-year course in general botany is designed primarily for the student who will take perhaps only one science course or, at most, only a few. Students who want to major in botany will also find the course stimulating and may even wish to pursue special projects. These special studies, although not required, give the prospective botany major the chance to do independent work with his own instructor outside of class.

The course is a composite lecture-discussion-laboratory presentation taught by the regular staff. The aim of the course is to examine how environment and heredity influence what plants are and how they behave, and to study the diversity of plant types that evolution has produced. To these ends the course involves (1) observations on plants in the field, (2) microscopic studies in the laboratory, (3) laboratory and greenhouse experiments, (4) studies on the heredity contribution to behavior, and (5) consideration of the major plant groups now inhabiting the world.

## CHEMISTRY

### 1, 2, General Inorganic Chemistry

The first semester of Chemistry 1, 2 is devoted to a consideration of the fundamental principles of chemical science. The properties of matter in bulk—the gas laws, solution phenomena, quantitative aspects of chemical reactions, chemical equilibrium—are related to the molecular structure of matter and further to the structure of the atoms themselves. The quantitative aspects of the principles are discussed extensively and, in the laboratory, a number of experiments illustrating these principles are carried out.

In the second semester a systematic study of the chemistry of the metallic and nonmetallic elements, as a function of their position in the periodic table, is supplemented by laboratory exercises in the qualitative analysis of some twenty common ions by semimicro techniques. An introduction to organic chemistry stressing structural isomerism and a knowledge of functional groups is also included.



For the very able student with excellent secondary school preparation there are special sections of General Chemistry which emphasize theory. In these sections significantly more attention is given to atomic and molecular structures, kinetic-molecular theory, and

thermodynamics. Introductory calculus is used during the latter half of the course. Several paperbound books, mimeographed notes, and parallel reading form the textual background for the course.

In the laboratory, part of the semester is given over to quantitive analysis, part to independent investigations. The latter experiments are projects in which students are asked to make critical observations, to formulate hypotheses to explain them, and to devise and carry out experiments to test the hypotheses. Students proceed at their own rate and have the satisfaction of being introduced to research.

Criteria for selection are (1) at least one year of both high school chemistry and physics, (2) a good mathematical background, (3) SAT verbal and mathematics scores usually above 650, (4) a chemistry achievement score (if available) above 650, (5) an intended science major, and (6) a good performance on a qualifying test administered at Duke during Freshman Week or a score of 2 or 3 on the CEEB Advanced Placement Chemistry Examination.

### 42, Introduction to Chemical Analysis

In the second semester, a mature course in the physical chemistry of solutions is open to well-qualified chemistry and other science majors in the B.S. curriculum. Fundamental to succeeding courses in the Department, Chemistry 42 treats (1) the structure of molecules and complex ions in terms of a simplified molecular orbital theory, (2) the theory of solutions of electrolytes, and (3) homogeneous solution equilibria in terms of the activity concept.

Laboratory experiments are designed to illustrate the procedures of volumetric, gravimetric, colorimetric, and chromatographic analyses and to demonstrate the application of these methods to problems in quantitative chemistry and to the determination of physical constants.

Approximately three-quarters of the class will normally come from Chemistry lx, with the remainder being drawn from those students with superior performances in Chemistry 1.

## ECONOMICS

### 1, 2, Introduction to Economic Problems and Policies and the Evolution of Economic Ideas.

Economics 1 aims to give the student an understanding of the present day American economy and the challenge to it from centrally planned economies. It considers the policies that are used or proposed to deal with problems of depression, inflation, growth, and automation.

Economics 2 is a study of man's economic activities and his ideas about them from the ancient world to the present day. Emphasis is given to the historical roots of present day economic ideologies.

In addition to the courses described above, Economics 57 and 58, Principles of Accounting are open to freshmen who have achieved a score of 600 in both the verbal and mathematics sections of the SAT tests. The election of these courses in the freshman year by qualified freshmen is particularly valuable to students who intend to major in accounting.

### 57, 58, Principles of Accounting

Economics 57 provides a basic knowledge of accounting and a consideration of financial statements. Attention is focused on the nature and purpose of accounting, the measurement and classification of economic data, and accounting reports as a tool of management and the investor.

Economics 58 is concerned with the problems of accounting for and control of monetary assets and costs, the problems of capital stocks and the elementary problems of decision making. The relationship of the firm and national income accounts is examined.

## ENGINEERING

### 1, 2, Engineering Graphics

These two courses deal with drawings as linear presentations of objects. All engineering students are required to complete them, generally during the freshman year. They provide the student with a universal means of communication and give him a tool for resolving many engineering problems. The courses are a prerequisite for creative work in any field of engineering or science for they cultivate the ability to *visualize* space relationships.

In Engineering 1 the student learns the language of graphics, the rules of orthographic projection and drafting techniques. Most of the work is done in pencil, both free-hand and with instruments. Engineering 2 continues graphical representation as applied to drawing board geometry. Problems involving intersections and development of surfaces and the relationship of lines and planes are solved. Solutions are derived through application of orthographic principles acquired the first semester. Mathematical problems, charts, graphs, elementary nomography, and other special problems are offered as time permits.

## ENGLISH

### 1-2, Freshman Composition

Several years ago the University revamped its system of teaching freshman composition. Here briefly are the features of the new course. (1) The reading in English 1-2 is drawn from the writers in England and America of this century because such writing is closest to the interests and experiences of the young men and women of this generation. Once a week in a general lecture the reading assignments are discussed by some qualified member of the Department, often one of the senior professors. This lecture is the starting point for a discussion of the reading in the classroom, in the conference, and among the students themselves. An advantage of the lecture system as here employed is that through it the freshman comes to know not just one teacher but a large number of the departmental staff of more than fifty members. (2) Besides the general, lecture the student each week attends one meeting of his class (or section) made up of about eighteen members. Here his own instructor directs a discussion of the week's reading or talks about those problems of composition which are pertinent to his students. (3) Most problems of composition, however, are individual, and so it is in the weekly tutorial conference that the student is likely to receive his most valuable assistance. In the conference, the instructor reads, discusses, and grades the weekly theme. The student not only is given the reasoning behind the grade imposed upon his theme, but he also has a chance to explain his own position and to find out ways of improving his work. It is here especially that the student realizes that he is not an anonymous member of a crowd; instead, the whole course is focused on him and is designed for his individual benefit.

Through these varied approaches each freshman, then, receives the advantages of the three historic modes of instruction: the formal lecture, the group discussion, and the private conference.

For freshmen who wish to undergo training in imaginative prose writing, the Department of English sometimes sets aside a special section of English 1-2. Persons who have shown some talent of this kind may apply for permission to enter the special section. Their applications will be acted on after a preliminary test during Freshman Week.

Freshman English is an enterprise which involves not the English department alone but in some ways the whole college community. For example, the Duke Players annually present one of the plays assigned in the course; so that the freshman may read the play,

discuss it in class, hear a lecture on it, and then see it acted. Within the freshman class, a sense of intellectual kinship is created by the common readings. Actually, since the readings are largely those read by the preceding class, the undergraduates as a whole share a body of literary knowledge that can be used for informal discussion or for helpful reference by instructors in other courses throughout the University.

### 51, Public Speaking

The ability to express oneself orally is a valuable asset to anyone, and is a necessity for those going into the professions of law and the ministry. English 51 is designed to develop this skill, and to give the student the poise and confidence necessary to think and speak freely before an audience. Particular attention is paid to the gathering and organization of materials.

This is a one-semester course, open to freshmen in both the fall and spring semesters. It satisfies the prerequisite for advanced courses in public speaking.

## FRENCH

**(See Romance Languages)**

## GEOLOGY

Although students normally begin work in the department in the sophomore year, these courses are open to freshmen with SAT verbal and mathematics scores averaging 600 or higher.

### 51, 52, General Geology

Geology 51, 52 offers a broad survey of the hard rock crust of the Earth and its softer mantle of debris and soil on which life depends. The first course deals with the forces which build up, change, and destroy the accumulated formations that make mountains, underlie the sea bottom and ocean basins, and floor valleys—the forces of wind and weather, running water and moving ice—and the underground forces of volcanism and diastrophism. Lectures are supported by the examination of common minerals and rocks in the laboratory and by the study of geologic maps. In the second semester the broad aspects of the physical history of the Earth and the evolution of life forms is studied. Basic principles used in reconstruction of the sequence of geologic events and the relative dating of these events is emphasized. The close interplay between the physical and biological history of the earth is stressed and possible causes and the significance of major trends and events is examined in terms of our knowledge of present day physio-chemical and biological processes.

## GERMAN

### 1-2, Elementary German; 63-64, Intermediate German

"Elementary German" obviously must concentrate on grammar and structural language tools, adding as much reading of illustrative material as time allows. "Intermediate German," on the other hand, is chiefly concerned with reading (short stories, poems, etc.) combined with certain necessary grammar review. The facilities of the language laboratory are particularly designed for students in both of the first two years of German. Laboratory exercises are aimed at sharpening auditory comprehension, increasing fluency, and raising the general level of student language performance.

## GREEK

### 1-2, Course for Beginners

The purpose of this course in the elements of classical Greek is to provide the foundation for development of the ability to read Attic prose, and at the same time to give the beginning student an introduction to the importance of the achievements of the ancient Greeks and their contributions to modern civilization. The most common vocabulary and idioms in Greek are studied, and emphasis is placed on the syntactical usages most frequently encountered in Greek authors. To lend vitality to the study of grammar, selected passages from many notable Greek writers are read and analyzed. Also, in vocabulary study attention is given to English words derived from Greek.

### 15, Mythology

Greek mythology introduces the student to the subject by stressing content while devoting some attention to sources, types, and analysis of the classical myths. Myth arises as man's imaginative response to facts of his experience in physical, social, and historical contexts. In consequence, myths form the seed of inspiration for the greatest works of Hellenic art and literature. These creative influences of the myth inhere in surviving sculpture, painting, and poetry, and in their continuing power to stimulate more recent artists and poets. Greek 15 is offered as an elective for freshmen in either semester, and no knowledge of the Greek language is required.

## HISTORY

### 1, 2, Modern History

Aware that almost every student who enrolls in Duke University will have had courses in history, the History Department has

attempted to provide a course for freshmen which will be instructive and interesting not only to those students who have had little or no history, but also to those who have studied history for several years. The subject matter of Modern History offers a student an opportunity to understand better how his own society has developed. It also helps him to appreciate present day problems in a way which the study of the past alone can supply. For example, the course emphasizes themes which are just as vital to an understanding of our own problems as they were to those of almost every century in the past. These themes are (1) the rise of the national states and the conflict between liberty and authority within them; (2) the problems of peace and war among these states; (3) the economic practice and theories of modern times, especially the way in which capitalism has changed through the years; (4) the faiths and ideologies men live and die by.

Although a firm understanding of the way in which these themes developed is obviously of importance, equally important for the college student is the ability to evaluate critically historical writings and interpretations and to draw conclusions himself from the sources from which history is written. Consequently, considerable emphasis is placed upon encouraging the student to think critically and upon training in the techniques of historical investigation.

### 1x-2x

History 1x-2x is designed as a seminar-type course for students who have had a good background in European history, who can read and comprehend rather large amounts of historical material in a semester, and who are capable of examining historical problems with a minimum of attention to historical chronology. The Department determines those who are qualified by consideration of SAT verbal scores, completion of three units of high school history, and an interview with the student. Students who have earned a score of two or higher on the Advanced Placement Examination in American history may also be admitted to the course.

The class will meet less frequently than the regular freshman sections, and each section of 1x-2x will number approximately twelve to fourteen students. Class discussions will be on readings assigned during the previous period, and debates may be arranged between members of the class on various topics. Such materials as the Rinehart Series (*Source Problems in World Civilization*) and the Heath Series (*Problems in European Civilization*) will be used during the semester, as well as other pamphlets, paperback books, and

articles dealing with some of the leading personalities and the major issues in history. Semester projects in the form of written papers will be required. Short papers—critiques, essays—will also be assigned during the term.

## LATIN

### 1-2, Course for Beginners; 63, Cicero's Orations; 64, Vergil's Aeneid; 91-92, Latin Prose and Poetry

The beginning course provides the fundamental grammar and, toward the end of the year, the reading of some easy prose. In Latin 63, 64 the student will read some of Cicero's orations and part of Vergil's *Aeneid.* If he begins in 91-92, he will find himself reading selections from great writers of prose, such as Pliny and Seneca, and great poets, Catullus, Horace, and others.

The two more advanced courses purpose to introduce the student to masterpieces of one of the world's greatest literatures, and to develop and promote a capacity to read Latin with understanding, appreciation, and enjoyment.

## MATHEMATICS

### 17, Introduction to Finite Mathematics; 18, Elementary Statistics

Mathematics 17 introduces students, early in their college career, to several concepts in modern mathematics. The first topics covered are close to students' experience, and the whole range comprises elementary logic, sets, vectors and matrices, and probability theory. Applications to problems arising in the biological, physical, and social sciences are stressed. In contrast to calculus, which deals with infinite sets and limiting processes, this course deals with finite sets of objects. Many of the most profound problems in mathematics are finite in character.

Mathematics 18 gives a brief but clear presentation of statistics as an applied mathematical subject. This course aims to develop both an appreciation for and an understanding of the basic ideas and methods of statistics. Topics studied include the summation of data, means and standard deviation, normal, binomial and other distributions, sampling, statistical estimation, and testing hypotheses.

Mathematics 17 and 18 are primarily designed for students who do not intend to major in a science.

### 21, 22, Introductory Calculus

A revised curriculum in mathematics has recently been introduced. In offering it the Department of Mathematics believes that the new course sequences will do much to meet the need for more and more mathematics felt by research workers in scientific fields.

Most students will begin their mathematical training with the course entitled Introductory Calculus. The concept of a function will be introduced, and trigonometric, logarithmic, and exponential functions will be given special attention. Graphs and applications of such functions will form a basic part of this course. In the section on plane analytic geometry, the equations of straight lines, circles, parabolas, ellipses, and hyperbolas will be derived and properties of these curves will be studied.

In another part of the course the concepts of the calculus will be taught. The discussion of many of the types of motion that are of interest, e.g., the motion of molecules in a gas, the flight of an airplane, and the flight of a rocket require ideas that form the basic part of calculus. The calculus concepts also enable one to find the lengths of curves, surface areas, and the volumes of irregularly-shaped solids. In this course students will be given the tools and calculus concepts that will enable them to solve many of the above-mentioned types of problems.

For the small group of freshmen who will need some review work before entering the calculus courses, the University offers a one-semester course entitled Algebra and Trigonometry, Mathematics 11.

### 41-42

For students who have demonstrated marked proficiency in mathematics the Department offers special courses. In these the topics of Mathematics 21, 22 are covered in a more extensive and rigorous fashion.

Candidates for the special sections must present four units of college preparatory mathematics and SAT verbal and mathematical test scores of 650 or above.

## MUSIC

### 1-2, Introduction to Music

Music 1-2 is designed for the general student who wishes to investigate the cultural heritage of musical literature. It provides a technique for perceptive listening by using the elements of rhythm, melody, instrumental color, and form as a basis for stylistic and critical

analysis of masterpieces of music in all media, with reference to their social and historical functions. No musical skills are prerequisite.

### 15-16 or 65-66, Theory

These courses are prerequisite to the course sequence leading to a major in music. They deal with (1) the comprehension and manipulation of those basic melodic, rhythmic, and harmonic techniques upon which Western music is based; and (2) the sharpening of skills involving ear training, sight singing, keyboard harmony. These courses are by no means limited to music majors but do presuppose an acquaintance with musical symbols. A basic piano technique would be helpful, but is not essential.

Although the background demands of the two courses differ, each represents the same objective. Assignment to one or the other is based on a proficiency examination required of all Theory students.

### 47-48, Applied Music

Private instruction from artist-teachers is available in voice, piano, organ, and orchestral instruments. A course of study may be continued for four years and should lead the student through the establishment of a secure technical foundation and into a serious study of the interpretation of musical styles and literature. Though the course is recommended strongly for prospective music majors, general students are also welcome in it.

## PHILOSOPHY

### 41, 42, Knowledge, Fact, and Value

These courses provide an introduction to philosophy through the study of its main problems. Philosophy 41 is concerned with the nature of truth and fact, evidence, faith, and knowledge, and with the nature of the fundamental categories, ultimately descriptive of the universe. It is, then, an introduction to theories of the nature and kind of knowledge man can attain and to some major metaphysical theories about the nature of the universe of which he has knowledge.

Where Philosophy 41 deals in general with knowledge and fact, Philosophy 42 deals with value. In particular, it provides an introduction to the problems that arise out of the evaluation of actions as right or wrong, good or evil, reasonable or unreasonable. It inquires into the grounds for these evaluations and also seeks to give a systematic and general account of the nature of the concepts used in evaluation and their interrelations.

Both these courses usually involve a certain amount of reading

in the philosophical classics. In Philosophy 42, for example, students may read from the works of such writers as Plato, Kant, and Mill, though no attempt is made at a comprehensive treatment of the history of philosophy. In these courses, students with a talent for abstract reasoning tend to do well; others have to work to develop this ability. Philosophy 41 and Philosophy 42 may be taken in either order.

### 48, Logic

Philosophy 48 deals with the analysis and evaluation of reasoned arguments. It provides a general method for formulating and testing the validity of many different types of argument. The course also aims at making the student sensitive to alternate interpretations that may be put on an argument, and aware of the part played by ambiguity and vagueness.

The student learns to use some of the techniques of modern symbolic logic and gains some sense of what is meant by rigor in formulation and proof, and of the nature of formal sciences.

## PHYSICAL EDUCATION

### 1-2

#### Men

Six different activities emphasizing large-muscle exercises are included in the first year's curriculum: boxing, fitness training, speedball, swimming, tumbling, and wrestling. Each receives a proportionate amount of attention. In connection with this training, each student is given two physical performance tests during the first semester; the first test is administered during the second week of classes, the second during the last week of the semester. Four events are included in each test: standing broad-jump, dips on parallel bars, zig-zag run (70 yds.), and sit-ups (2-min.).

In each semester of his sophomore year, the student elects one from the following list of sports to which he can turn for recreation in later life: badminton, basketball-handball, golf, swimming, tennis-volleyball, and apparatus-tumbling.

Students with a physical handicap that prevents normal participation take a medically prescribed exercise program which fulfills graduation requirements.

#### Women

Through the required physical education classes, each student becomes aware of her own potentialities and needs in efficient move-

ment; she gains an understanding of the importance of exercise as a part of effective living in adult years; she has the opportunity to improve present skills and to gain the satisfaction that comes from learning new ones; and she has a broader understanding of the place of sports and dance in American culture. This learning takes place during the classwork of the first two years, through election from a wide variety of offerings in the areas of sports, dance, and aquatics, and through reading, discussion, and written tests.

Because of the wide range of physical education abilities among entering freshmen, a series of placement tests is given during Freshman Week followed by individual interviews. Freshmen with specific needs in rhythm, posture, sport skills, and swimming take special classes during the first half of the semester. Others elect activities such as hockey, tennis, badminton, swimming, golf, riding, and modern dance. During the winter, activities include bowling, badminton, swimming, fencing, volleyball, basketball, and several types of dance. Courses are divided into beginning, intermediate, and advanced sections, and each student registers in the section which corresponds to her ability.

## PHYSICS

### 1-2, Introductory Physics; 41-42, General Physics

The Department of Physics offers two different courses at the introductory level. These courses are of comparable scope and both are open to freshmen. Physics 1-2 is primarily for those students who do not intend to major in science. A good preparation in algebra is required, but not necessarily in trigonometry. Physics 41-42 is designed for science majors, engineers, pre-medical students, and others who wish to elect it. Introductory Calculus must be taken prior to or concurently with Physics 41-42.

In scope the introductory courses include the study of mechanics, heat, optics, acoustics, electricity and magnetism, and atomic and nuclear physics. As examples, the concepts dealt with in two of these fields can profitably be given in more detail. In mechanics one considers such things as the properties of fluids, forces and accelerated motion, mechanical energy and the conservation laws for momentum and energy, rotational and planetary motion, oscillatory motion, and gravitation. Again, in electricity and magnetism, which are taken up together because of their close relationship to one another, the properties of electric and magnetic fields, produced by stationary and moving charges, the forces on electric charges in

electric fields and on currents in magnetic fields, and direct and alternating current circuits are studied.

**41x-42x**

A special section is offered for students who wish to major in physics and others who have high aptitude for physics and mathematics. Moderate use is made of the methods of calculus, consistent with the student's knowledge of calculus from the concurrent Mathematics 21,22 or 41,42. In the course certain topics are treated at greater depth than in the regular sections, and theory is emphasized.

Candidates for the special section should have good high school preparation and records in physics and mathematics and would normally have SAT verbal and mathematical test scores of 650 or above. In special cases an outstanding student who has had no high school physics will be permitted to register for the special section.

## POLITICAL SCIENCE

### 11-12, American and European Political Systems

Political Science 11-12 provides an introduction to the principles and practices of modern government, especially those of the United States, Great Britain, France, and the Soviet Union. The first semester, devoted largely to American government, considers such topics as: constitutionalism and the ways of restricting political power; means of achieving effective relationships between the President and the Congress; ways of making bureaucracy responsive and responsible; the influences of parties and pressure groups; federalism in theory and practice; the judicial function, with special attention to U. S. Supreme Court decisions involving freedom of speech, freedom of religion, equal protection of the laws and related issues of personal liberty; and a selected number of issues in the arena of domestic and foreign policy. The second semester is concerned primarily with European governments and seeks not merely to describe their institutional structure and political practice, but to contrast one with the other and all with the American form of government. The purpose of these comparisons is to delineate the essential characteristics of constitutionalism (whether of the presidential or parliamentary form) and of totalitarianism.

**11x-12x**

These sections are open to freshmen who have high SAT verbal scores and whose academic record and special interest in the subject matter of the course give promise of superior performance. The

sections are limited in enrollment, emphasize class discussion, and concentrate upon a more intensive examination of a selected number of contemporary political problems and issues.

## PSYCHOLOGY

### 91, Introductory Psychology

This course is open to freshmen in the spring semester.

Psychology is the field of study which seeks by scientific methods to describe, understand, and predict the behavior of living organisms. Psychology 91 attempts to give the student an overview of that science. The course content includes such diverse areas as the nature of scientific method; experimentation and quantification as applied to the study of behavior; intelligence and the factors influencing it; the basis for learning, perception, sensation, and motivation; the nature of personality—its manifestations and origins; and social and abnormal behavior. Considerable attention is given to the experimental literature and its relevance to the development of a theory of behavior.

## RELIGION

### 1-2, The English Bible

Religion 1-2 is a comprehensive study of the Bible, including the reading and discussion of the most important parts of the Old and New Testaments. Study of the biblical texts themselves is the primary emphasis of the course, but this enterprise requires considerable reading of selected biblical scholarship of various kinds. Some classes employ short analytical essays and occasional research papers as aids to learning. The complexity of biblical materials and the great mass of significant scholarship in the field make this course a demanding and stimulating one.

Inasmuch as the Bible contains the primary literatures of the basic religious traditions of the West, this course, conceived as a humanities study, is of indispensable significance for a liberal education. A major aim of the course is to help a student, through a creative apprehension of the past, to become aware of the crucial role played by biblical religion in forming the expectations of the Western mind.

The Bible is studied as intellectual history, in which the literatures are examined in the light of their origins in the history and religion of biblical times. While each professor emphasizes to some degree his special interests and enthusiasms, he is sensitive to the varied

religious backgrounds of his students and attempts to present the Bible in the best scholarly traditions of historical, critical, and phenomenological analysis. A major goal of the course is to make intelligible in the present something that has been significant in the past, with a view toward discovering whether it has continuing relevance.

**1x-2x**

The department also offers advanced sections for those freshmen who score significantly high on the SAT verbal and English achievement tests. These special sections are limited in size in certain meetings each week and give more opportunity for active discussion and participation by students. Individual study is encouraged in order that students may pursue their particular interests. These sections are intended to attract students of high verbal ability who have some personal interest in biblical studies and who would welcome a course in which student initiative plays a greater role than is usually the case.

## ROMANCE LANGUAGES

**French 1, 2, Elementary French; Spanish 1, 2, Elementary Spanish**

French 1-2 and Spanish 1-2 offer an intensive aural-oral introduction to the language, followed by careful reading of edited texts. In each of these courses the recitation is supplemented by regular laboratory listening sessions.

**French 63-64, Intermediate French; Spanish 63-64, Intermediate Spanish**

French (Spanish) 63-64 is an integrated course in speaking, reading, and writing. There is a systematic review of the basic grammar and an extended reading program. Frequent listening periods in the laboratory are a regular part of the course.

**French 91-92, Introduction to French Literature**

French 91-92 is designed to acquaint the student with the great personalities and the dominant styles and modes of thought which constitute the French literary tradition. The student utilizes as an instrument of literary study the language skills which he has acquired in basic courses: he reads to comprehend the thought of the writer and to appreciate the qualities of his expression; he hears his teacher explain and comment in French on the texts; he is encouraged to express in French his own understanding of what he has read.

### Spanish 91-92, Introduction to Spanish Literature

The readings in Spanish 91-92 from representative authors are designed to be an introduction to the literature, and are analyzed through class discussion in Spanish.

## SOCIOLOGY

### 91, Introduction to Sociology: Concepts and Procedures

This course is open to freshmen in the spring semester.

This course will emphasize the basic concepts and procedures employed in understanding social organization, social function, and social process. These areas will be subdivided into status, power, and social class; the integration and malintegration of social systems; and social interaction and social change, respectively. Special attention will also be paid to the various *levels* of sociological analysis—individual, group, societal, and cultural—and their relationships to one another. Conceptual approaches will be illustrated by the use of material from demography, collective behavior, human ecology, criminology, and studies of the family and other specific institutions.

Sociology 91 seeks to provide a general approach to the understanding of collective life and a set of conceptual tools useful in more advanced study.

### 92, Introduction to Sociology: Sociological Studies

This course is open to freshmen in the spring semester.

This course will introduce the procedures of sociological inquiry through an examination of selected research monographs. Through this course the student should not only become acquainted with methods of framing and answering questions about social behavior, but he should also acquire an appreciation of the techniques of critical evaluation of sociological studies.

Class discussion of the research monographs will deal with questions such as: What is the main problem(s) with which the monograph is concerned? What theory and concepts are used to explore the problems? What kinds of data are brought to bear on the problem? What are the findings of the research? How adequate are the author's theory, concepts, and types of data for analysis of the problem? If he had used alternative theories, etc., would he come out with the same conclusion? What general problems for further study are suggested by the study?

**SPANISH (See Romance Languages)**

## ZOOLOGY

### 1, Animal Biology and 2, General Zoology

Zoology 1 deals with the structural and functional organization of the animal organism. Within this framework the basic properties of life, the cell, and the interrelated parts of the responsive animal are discussed. Special attention is given to the replication of the inheritable material, the differentiation of cells and the subsequent development of the new organism. During the course of these studies many techniques of modern research are introduced, and the important relationships of the other natural sciences and formal sciences to biology are illustrated. These aims are accomplished through a series of lectures and laboratory exercises.

During Zoology 2 emphasis is placed on the diversity of the animal kingdom. The structural characteristics of animals in each of the major taxonomic groups are studied, and the ways in which the different structural organizations accomplish the basic functions of any animal are explored. Evolution, the origins of animal diversity, and ecology, the relationships of animals to their environments, are the coordinating principles of the semester. Other principles such as animal relationships, parasitism and commensalism, are also illustrated.

In this course a limited number of students who show special aptitude and interest are invited to participate in a non-credit seminar which meets in a faculty member's home. Outstanding scientists are invited to lecture informally to this group in various areas of modern biology.

# DEPARTMENTAL MAJORS

Every academic department offers one or more areas in which a student may concentrate and bring to a focus his intellectual interests. These majors are described in the sections that follow.

Many students will know from the outset the area in which they wish to concentrate. Others may postpone a decision until the spring semester of their sophomore year, when they will have had an opportunity to experiment with a variety of fields. The first opportunity to declare a major and move to an academic department for formal advising will occur in the spring of the freshman year. All students, however, are asked to make their choice before they conclude their sophomore year.

## ART

The field of art embraces two areas—the practice of art and art history—which represent different, but not mutually exclusive, avenues for the acquisition of knowledge and experience in the visual arts.

The practice of art as experienced in the studio is limited to basic design, graphics, and painting through which the student may gain sufficient experience to define his interests and aptitudes for later specialization. The program does not attempt to accomplish professional training in specific practical art skills but rather to fulfill an objective of liberal education to which the art experience is a contributing factor. A talented student may upon graduation enter a graduate or professional school and expect to accomplish his professional objectives within a two or three-year period of concentration.

Art history is a relatively new member of the academic family of humanistic studies which was formalized only in the early part of this century. The concept of "art history" belongs, however, to the 18th century when J. J. Winckelmann first perceived the value of interpreting works of art as human data to reconstruct the social, religious, cultural, and intellectual climate within which man lives at a particular moment of history. The popular notion of "appreciationism," as such, is not a function of art history. As an academic discipline art history is first of all an aspect of cultural history and merges further with other humanistic areas, such as philosophy, re-

ligion, and literature. By the nature of its research methods and documentary sources it presupposes a concurrent development in language tools.

The two courses which will define for the beginning student the fields of art history and studio work are described elsewhere in this bulletin. These are the Introduction to Art History and the optional related course, the Design Laboratory, which is taken concurrently.

The student selecting art as his major will elect either art history or design for concentration. In design he will follow a prescribed sequence of courses designed to lead him from basic problems in drawing and design to the art of painting and graphics. In the history of art he will effect a chronological spread of area courses and select one area for specialization.

The department offers an honors program in art history which leads the superior student into independent study and research as a prelude to graduate study in the field. Special lectures, traveling exhibitions, and art films are arranged by the department or the Duke University Student Union, and field trips are arranged in connection with art history and studio classes from time to time.

## BOTANY

Some students elect botany as a major even though they do not intend to become professional botanists. Botany gives a broad appreciation of biological principles from a scientific point of view. The non-preprofessional student will develop an understanding of living things, will be able to cope with practical botanical problems (for example in gardening and horticulture), and will understand more thoroughly the world around him. Other majors in botany look upon their training as lending to a career. The course work for the botany major gives an adequate foundation for the later graduate training that is required for professional activity in almost all botanical fields today.

Students with previous training in botany are eligible to take the Duke advanced placement test in botany during Freshman Week. Those students who demonstrate, through the test, a broad knowledge of botany will be exempted from Botany 1 and/or Botany 2 and permitted to register for a more advanced botany course. They may also have the opportunity to work on some special problem with a faculty member.

The undergraduate program in botany is broad. But realizing that individuals' interests differ, the department takes a liberal view toward course requirements. Botanical studies can be divided into

two areas—field and laboratory—and the course requirements are divided between these areas. The student must take two one-semester field courses (from among plant identification, ecology, and taxonomy of lower groups) and two one-semester laboratory courses (from among physiology, bacteriology, genetics, and anatomy). The student may then choose from a wide selection of other courses to complete his major.

A botany major should have basic training in certain related fields. Introductory chemistry and mathematics are strongly suggested, but the student is given a free choice.

The department tries to bring all its majors into the center of the botanical activities at Duke. The student's program may be as varied as he wants to make it and may include research work or part-time employment with staff members, field trips and informal seminars, or even summer study-research projects on the campus or at Duke's marine biological laboratory on the coast at Beaufort, North Carolina.

## CHEMISTRY

Chemistry has been defined as the science of substances—a discipline that is concerned with structure, properties, and reactions that change one substance into another. Yet this definition fails to suggest that the province of chemistry also includes other endeavors, such as the search for new high-energy rocket fuels and for drugs that may curtail the ravages of cancer. Whether one's interest is in basic or applied chemistry, he at one time will pursue his study on the macroscopic level where "bulk" phenomena involving perhaps a billion-trillion molecules are observed, and at another time on the submicroscopic level where the intimate course of reactions between individual molecules is deduced.

The program for the chemistry major is designed to give a basic understanding of the fundamental principles of chemical science and a practical knowledge of common laboratory techniques and experimental procedures. The curriculum for the Bachelor of Science degree, approved by the Committee on Professional Training of the American Chemical Society, gives intensive training in chemistry and the related disciplines of physics and mathematics, while in the curriculum for the Bachelor of Arts degree, somewhat less than half a student's time is devoted to his major and related work.

The following sequence of courses is common to all major programs. *General Chemistry* emphasizes the general theory and behavior of matter in bulk and the structure, properties, and reactions

of many elements and compounds. The Periodic Table and the chemical bond are stressed. *Analytical Chemistry* presents the theory of solutions and the techniques of gravimetric, volumetric, and colorimetric methods used to identify substances and establish the composition of chemical systems. *Organic Chemistry* describes the systematic behavior, the size and shape of the individual compounds of carbon, and the methods of preparation of the various classes of carbon compounds. *Physical Chemistry* stresses a critical, rigorous examination of the principles underlying all areas of chemistry. The states of matter, solutions, velocities of reactions, equilibrium, molecular structure, and thermodynamics are among the areas treated.

Depending on the type of curriculum, advanced work is also pursued in one or more of the following areas: quantitative analysis, inorganic chemistry, qualitative organic analysis, nuclear chemistry, chemical instrumentation, and organic preparations.

The Department of Chemistry recognizes its responsibility toward those students whose secondary school preparation has been exceptional and whose ability has been clearly demonstrated. For these gifted students, the Department offers a different and challenging curriculum during the first two years aimed at enrichment rather than acceleration. During the third year, these students are taught in special recitation and laboratory sections of the regular course; in the senior year they may pursue independent study and research in the Graduation with Distinction program.

## CIVIL ENGINEERING
**(See Engineering Studies)**

# CLASSICAL STUDIES

## GREEK

The major in Greek is concerned with the literature and history of ancient Greece. All students take the same core of work. In the second year the student is introduced to two important classical authors, Herodotus and Xenophon. Selections from Herodotus on the causes of conflict between East and West illustrate his universal Hellenic curiosity and sympathy, and indicate the basis of his claim as the "Father of History." In the *Anabasis* by Xenophon the reader, as he follows the upland march of the 10,000 Greeks through the heart of the Persian Empire, glimpses something of the resourcefulness and indomitable spirit of the Hellenes. Also, he becomes acquainted with an incident decisive in the orientation of the Greek world eastward, and thereby in the birth of the Hellenistic Age. These readings are preceded by a grammatical review, and they are accompanied by further study of syntax and forms.

The third-year course serves the general function of increasing the student's knowledge of the Greek language and literature. The chief aim of the first semester's study, Books I-III of Homer's *Iliad,* is to show the greatness of the poetry of Homer. Emphasis is laid on the highly poetic character of his language; a closer acquaintance with his poetic usage is achieved by requiring the students to give Attic prose equivalents of the words and expressions that Homer uses, with a view to showing how far above the level of prose Homer's language rises. Later the class uses Matthew Arnold's four essential characteristics of Homer's poetry as a basis for criticism, and with these as criteria tests the great poetic translations from Chapman to Bryant to determine which of the characteristics they possess and which they lack. Then the students in turn are called upon to write a verse-translation of a number of lines, and the same criticism is applied to their productions. The outcome of this method of study is a keener appreciation of the majesty and grandeur of Homer, and of the sublime heights of his poetry.

The work of the second semester is centered in the martyrdom of Socrates as described by Plato in his *Apology* and *Crito.* Special attention is given to vocabulary, forms, and syntax; and the literary aspects of Plato's writings are emphasized.

In the fourth year the student is familiarized with the dramatic

poetry of the ancient Greeks. Introductory lectures on the origin and development of Greek drama (tragedy and comedy) are followed by a study of three typical masterpieces selected from the works of Euripides, Sophocles, and Aristophanes. In addition to translation, special emphasis is placed upon the assimilation, transformation, and reproduction of the thought of the authors into readable and idiomatic English. This develops literary sense as well as analytic ability. Attention is given to the influence of Greek drama on subsequent European literatures.

In addition work is given in Greek prose composition and in Greek history. The first of these courses seeks to impart a knowledge of the principles of language in general, and of the forms, vocabulary, and syntax of Greek in particular, and thereby to cultivate the student's memory and give him a clear conception of the exact relation of clauses to one another.

In the second course a survey of the origin and progress of civilization in the Greek world from the Late Bronze Age to the Macedonian conquest is presented. Throughout the course strong emphasis is laid on underlying causes and historical significance of events.

## LATIN

The major program in Latin involves the study of works of Latin authors, commencing with the "third-year" courses in Latin prose and poetry. Lower-level courses, primarily in the mechanics of the language and the development of reading ability, are taught with the purpose of eliminating, to the greatest possible extent, the obstacle of a language which is not our own. The invention of writing gave to language, and the thought which it conveys, a life which the spoken word loses in the moment of speaking. A language "lives" then, not only in present utterance, but also wherever in reading it constitutes a bridge of communication. Latin is not generally in current spoken use, but a knowledge of the language, as the medium of expression, is prerequisite to full and satisfactory comprehension of the thought and literary achievement of the Romans as captured in their writing.

While it is certainly true that a command of Latin is beneficial to the speaker and reader of English, and while it may be that the discipline of the language is valuable in other application, the major importance of Latin lies in its use, as the instrument of expression, by some of the earliest, and still notable, thinkers of mankind. Western civilization draws its beginnings and early development from the ancients, and in the widespread sharing of their influence it has

its principal bond of unity. Artists, philosophers, and men of letters have continually returned to this source and foundation; and the reëstablishment of communication with the ancients and their creations was the birth of that Reawakening which was to be a parent of the Modern World.

The major program leads into intimate acquaintance with several of the great literary monuments and their authors; the incomparable prose styles of Cicero in philosophy and rhetoric, of Tacitus in historiography; the powerful, mordant satire of Juvenal, the modern-sounding scientific thought and theory of Lucretius. As education, these studies, like those of other great literatures, or philosophy, or fine arts, are a substantial contribution to the individual's cultural development and personal enrichment. And as training they are by no means to be despised or ignored in these days when the spokesmen for industry, business, and the professions with unanimous accord continually emphasize to their prospective recruits the virtues and values preëminently of education in the liberal arts. This curriculum furnishes the intending teacher in the secondary schools with background and depth, and the student who goes on to graduate work in the Classics with the necessary foundation for advanced study.

## ECONOMICS, BUSINESS ADMINISTRATION, AND ACCOUNTING

Three distinct programs of study are offered in this area. A student may major in economics, business administration, or accounting. Regardless of the major chosen, the student will be assured of a broad-guage education. The courses of study comprising these programs have been designed with a full awareness of the liberal arts tradition to which the University is committed. The Department feels strongly that its mission is not to train students for their first job after graduation but to instill those qualities of mind which will fit them for the responsibilities that will arise in their careers. Experience over the years has indicated that prospective employers prefer the broader background.

The general focus of the three majors in the Department is on the economic process—past, present, and future. Knowledge of this process is an important part of a liberal arts education. How society decides what to produce, how to produce, and who will enjoy the fruits of production in large part determines the nature of society, philosophically, socially and politically.

The major in economics is concerned with the economic process from a conceptual and analytical point of view and is especially

recommended for those who intend to go on to graduate work in economics. It also provides an excellent background for students who intend to do further work in other social sciences, law, or history.

The major in business administration builds on the same base but emphasizes the process by which the firm makes decisions and plays its role in society. A student majoring in this area normally pursues the same course of study as the economics major until the senior year, at which time he is directed to courses which stress in greater measure knowledge and techniques useful in preparing for a business career. This limited specialization can be further pursued by the choice of some elective business courses. Normally, a student who intends to do graduate work in business is advised to choose the economics undergraduate major.

The major in accounting, while building on the same base, is more concerned with the analysis and presentation of data which arise from the firm's operations. These data enable the firm and society to act more effectively. Students who believe that accounting is their future vocation and who desire a more professional preparation may elect either the public accounting program, which prepares them for the Certified Public Accountants Examination, or the industrial accounting program.

In the senior year, majors may pursue independent study leading to Graduation with Distinction.

## EDUCATION

The main purpose of the Department of Education is to provide professional preparation for teachers and other personnel for the schools. For this reason many of the courses offered by the Department are of primary interest to students who intend to teach. Such courses deal with principles and materials of instruction and their application to the classroom. However, the Department offers several courses in the area of liberal education which will help in developing a better understanding of people and society. Most of the courses in social and psychological foundations of education are in this category.

At the undergraduate level, Duke University prepares teachers for both elementary and secondary schools. Prospective elementary-school teachers major in education, since in this way they may best meet the dual requirements of gaining knowledge and skill in all of the areas taught in elementary school and acquiring an understanding of child development and learning theory. The University

prepares teachers for the secondary schools in the fields of art, English, foreign languages, physical education (women), mathematics, music, the sciences, and the social studies. Prospective secondary-school teachers major in the academic department of their principal interest and should choose related work which will strengthen their preparation for a teaching career. There is a special program in science education designed to provide a broad background in the sciences and mathematics.

Introductory Psychology is prerequisite to all programs in teacher education. This course provides an opportunity to develop a background for understanding the behavior of children and adolescents. It should be taken in the sophomore year. Social Foundations of American Education is also prerequisite to all programs in teacher education. It is intended to acquaint prospective teachers with underlying viewpoints, problems, and issues of education. It should be taken in the junior year.

Students preparing to teach devote an entire semester of their senior year to courses in designated subject matter and professional education, and to student teaching. During the last half of this semester they are engaged in full-time observation and student teaching in schools.

Advisers in the Department of Education will help in planning a program that will serve individual student needs. For example, each student's program must be designed to meet the requirements of the state or states in which he desires certification. Students may also be helped by their adviser to work toward a decision as to whether or not they should teach and, if so, what subject or grade.

Anyone planning to teach who majors in another department should also make an appointment with a Department of Education adviser prior to each registration period for the proper planning of his program. Such a contact will insure that a place will be available in the student teaching program in the senior year.

In the senior year, majors may pursue work leading to Graduation with Distinction.

# ENGINEERING STUDIES

## CIVIL ENGINEERING

The civil engineer must acquire a core of fundamental knowledge based upon scientific and engineering principles. To this end he studies mathematics, physics, chemistry, and other basic sciences, particularly the engineering sciences, including mechanics of solids and fluids, thermodynamics, electricity, and magnetism.

In addition, the civil engineer must be challenged to enlarge and mature his understanding of fundamental human values and their relation to the physical world in which he lives so that he can plan and design, administer or operate the essential facilities of the civilized community of which he is a part. He must develop an interest in society, understand his relationship to society, and recognize the responsibilities inherent in the relationship.

About one half of the civil engineering curriculum during the first two years is devoted to sequences in mathematics and the physical sciences, and most of the remainder to history, social science, and English, with special emphasis on written and oral communication. Also included is a study of engineering measurements, how they are obtained through surveys and presented on maps and plans.

The remainder of the curriculum continues the program of the first two years with further development and enrichment. It is the mathematics and solid mechanics of the sophomore year which lead directly to structural, soil, and fluid mechanics in the junior year. These, in the senior year, are applied to the solution of problems dealing with foundations and structural design, and with hydraulic, sanitary, and transportation engineering. The surveying and mapping of the sophomore year builds through the surveying and design of routes in the junior year, into the solution of the geometric problems of transportation engineering in the senior year. Similarly, the early consideration of the elementary properties of engineering materials is continued for a progressively better understanding of their behavior so that they may be used wisely and economically.

A planned program of electives in both liberal and technical subjects constitutes one third of the work in the junior and senior years. By this means the highly integrated engineering and science courses of the first two years are broadened and, within limits, a disciplined understanding may be achieved in one or more subjects that

appeal to the student. Suggestive of the latter are mathematics and the physical sciences; economics and business administration; political science, sociology, psychology; language; or any of the humanities courses.

In the senior year, majors may pursue independent study leading to Graduation with Distinction.

## ELECTRICAL ENGINEERING

The profession of electrical engineering utilizes the electrical and magnetic forces of nature and the properties of matter to supply human needs. Because electricity is the most flexible form of energy available to man, electrical engineering influences the living of most of the world's population. This profession is concerned with the *processing and transmitting of information*—as in television, radar, radio, electronic measurement and computation. It is equally concerned with the *processing, transmitting, and controlling of energy*—as in rotating machines, power systems, and automatic industrial processes. It provides most of our labor-saving home appliances and many of the instruments of modern scientific research and of modern medical practice.

The professional electrical engineer may engage in research and development, consulting, teaching, design and manufacturing, operation and maintenance, or management and sales.

The educational program of the Department of Electrical Engineering at Duke is directed toward the following four objectives:

1. To produce engineers who are equipped to function at the highest professional level, not only today, but several decades on into the future, regardless of the scientific advances that the future may bring. To meet this objective, the program seeks to provide a fundamental understanding both of the *science of engineering,* which is based on mathematics and the physical sciences, and of the *art of engineering,* which depends on human imagination and judgment.
2. To produce engineers who can function intelligently within the economic and social framework of our culture—persons who are able to extrapolate from the past, through the present, and into the future, in terms of human material wants and needs, and who are able to organize the human effort and financial resources necessary to provide the machines, goods, structures, and services that will meet those needs and wants.
3. To produce engineers who recognize their responsibilities as citizens of their communities.

4. To produce engineers who seek to continue aesthetic, ethical, intellectual, and spiritual growth.

The first of the four objectives is served by the required and elective courses in mathematics, chemistry, physics, engineering science, and electrical engineering; the last three objectives, by the required and elective courses in the humanities and the social studies. All four objectives are served by various aspects of the extracurricular program, including those of the general university program.

The instructional, research, and service staffs are selected for their competence and effectiveness in contributing to the four objectives. Furtherance of the objectives is also served by a continuing development of the staffs, the library holdings, and the teaching and research laboratories.

In the senior year, majors may pursue independent study leading to Graduation with Distinction.

## MECHANICAL ENGINEERING

Mechanical engineering, which is extremely broad in its applications, may include the design of products or production methods, supervision of production, management of business operations or technical projects, testing individual machines or complete plants, or conducting basic or applied research.

The function and work of the mechanical engineer has changed radically in the last two decades. He is evolving into a designer and creator of machines and systems; he is concerned with analytical details of devices and with the broader problem of integrating devices, machines, and personnel into efficient organizations. He needs to have a broad understanding of his environment, considerable skill in communication, an appreciation of the basic sciences, and a firm foundation in the fundamentals of the control and transmission of power in all its forms.

Understanding of his environment is approached by means of a planned program in the humanities starting with required courses in history and economics. It is enlarged by a planned program of electives in the humanities-social science area chosen by the student, in consultation with his adviser, to suit the interests and needs of the individual.

Communication skill is developed through required courses in English, mathematics, and graphics—the art of communication. The English courses lay the foundation for the writing and effective oral presentation urgently needed by the professional engineer. The

mathematics courses provide the analytical tools needed through a study of calculus and an introduction to the higher mathematics needed in this age of space. The graphics courses provide both an additional opportunity for effective communication and a tool for resolving many engineering problems. Required courses in physics and chemistry provide a foundation in the basic sciences. Students contemplating graduate work are urged to take some of the approved electives in this area.

The control and utilization of power in mechanical engineering is split into two sequences—a design sequence concerned with the machines, devices, and systems; and a power, or thermodynamic, sequence concerned with the fundamentals of mass and heat transfer. The design sequence is initiated with courses in drawing, descriptive geometry, statics, and strength of materials. These are accompanied by courses in material structure and properties, and a basic course in kinematics and kinetics. The design sequence is continued in the junior year through the machine design courses, and in the senior year by response of physical systems and electrical engineering.

Thermodynamics is encountered in the junior year through two basic courses. These are accompanied by a basic course in fluid flow and one in heat transfer. In the senior year, this sequence is continued with courses in combustion engines and power plants.

The interrelations between the design and thermodynamic sequences and the application of communication skills are emphasized through the experimental laboratory work of the junior and senior year and in the senior seminar courses.

In the senior year, majors may pursue independent study leading to Graduation with Distinction.

## ENGLISH

The study of literature is, and will always be, one of the broadest avenues to a liberal education. It holds wide opportunities to approach and synthesize the whole length and breadth of human knowledge and to deal, directly or indirectly, with the great minds of the past and present. These are, essentially, very "practical" functions just as, at the other pole, to study literature is to gain insight into the very practical art of communicating through the written word. But perhaps most of man's conscious activity takes place neither on a high metaphysical plane nor on the level of the daily job; on the middle plane where he often lives and acts, literature holds the finest resource for understanding human character and all its complexities,

for acquiring a sensitivity to the human condition and its workable values. Finally, everyone has to some degree an aesthetic drive: the study of literature gives it depth, direction, and rich satisfaction.

The student choosing a major in English concentrates in the study of English and American literature. The English Department has a varied program of offerings, and the major is required to satisfy a pattern of distribution rather than to take specific courses. As a result, the major will find his academic program marked by flexibility and individual responsibility. Usually he will be able to follow his preferences within a wide range of English and American literature and can also take two or more courses in some restricted area such as Elizabethan drama or nineteenth-century English literature or contemporary fiction, poetry, and drama.

The size and diversity of the Department also give him unusual freedom in the choice of his teachers. If he is wise, he will exploit the opportunity to select teachers who have differing approaches to literature and to classroom methods. He has, furthermore, a wide freedom in his program of related work, though he is helped in his planning by the member of the Department who acts as his academic adviser.

Various courses in the Department lead into rewarding activities besides the basic assignments. Twice a year some of the classes in Shakespeare present a public reading of a play; and the trend for other classes to organize similar readings has been growing. Other opportunities for creative expression are found in the *Archive* (the campus literary magazine), in the *Chronicle* (the newspaper), and in student groups devoted to speech, debate, and the drama. The Anne Flexner Memorial Award in Creative Writing is also given annually.

The Department poses some formal challenges to the more able student. In addition to the regular and traditional courses in literature, composition, speech, and drama, the English Department has instituted a number of upper-level "Conference Courses," limited to twelve students in each, for close study of various aspects of literature. A special Senior Seminar is offered majors who are candidates for "Graduation with Distinction in English." This seminar stresses independent reading and the writing of a critical research paper. The Department also offers to every major in his senior year the opportu- to enter any among a dozen courses that are primarily designed for graduate students and that introduce him to a more technical and critical approach than he will usually meet in the conventional undergraduate program.

## GEOLOGY

Geology is the physical science concerned with the study of the earth. Some of the interests of geologists are the physical processes acting on the earth's surface (water, wind, ice), the composition of the earth (rocks and minerals), its structure (continents, ocean basins, mountains), its economic products (oil, gravel, water, uranium), and its past history (origin, shifting positions of land and sea, kinds of life present).

Men and women versed in geology are utilized by federal and state governments and industry to help solve such varied problems as the location of petroleum deposits or the nature of the moon's surface. A considerable number of geologists are engaged in a wide spectrum of research in such specialties as oceanography, seismology, volcanology, and astrogeology.

The basic training of a geologist following the introductory survey courses is in four fields: (1) minerals (2) rocks (3) stratigraphy (4) structure. Additional courses depend in part on the specialization desired by the student. Basic training extends beyond geology alone and into other sciences: physics, chemistry, biology, and the mathematics. Fundamental principles and knowledge from all of these sciences is likely to be used in one specialty or another within the broad framework of geology. In some instances study in depth will be necessary within a related science for the student to be trained in a specialized field of geology. Thus the paleontologist must be trained in biology and the mineralogist in chemistry.

Undergraduates are encouraged to assist and in some cases to become junior partners in the various staff research activities.

## GERMAN

Germany and German-speaking countries have contributed many men of genius in a wide variety of fields: poetry, the novel, philosophy, music, medicine, psychology, and most of the natural sciences. A study of the German language is obviously a desirable and even required tool for opening up their achievements in these varied areas. Moreover, the United States in the last eighteen years has renewed her cultural, political and economic ties with Western Germany and Austria. This association is apparently destined to remain close for decades to come. A firsthand acquaintance with the German language, with the literature and social background of the Germanic countries, is therefore valuable and, in some cases, indispensable both to the future specialist and to the well rounded liberal arts student.

Germany, even though divided, is still a major state of central Europe. Knowledge of its language, culture, and civilization is essential for knowledge of the history and culture of modern Europe, and of Western civilization.

A German major is required to take eight semester courses in the Department beyond the intermediate level. In the early stages of study, language-laboratory facilities are of assistance; this approach is being increasingly emphasized in the work of the first two years. The German major is also asked to choose several courses among the various Humanities, i.e., other literature courses, including English or American or Comparative Literature, French, Spanish and Russian literature as well as suitable courses in philosophy, history, religion, and linguistics. Study in these areas rounds out a liberal education.

The aim of the Department is to place language and literature study within the framework of Germanic civilization and European culture in general. The poets and writers of world influence (Goethe, Schiller, Hölderlin, Heine and the modern figures of Rilke and Thomas Mann) are seen against the background of great musicians of Austrian and German birth (Bach, Mozart, Beethoven, Schubert, Schumann, Brahms) as well as the achievements of their greatest, most influential thinkers (Kant, Schopenhauer, Nietzsche).

What are the benefits of such a major? The purely cultural benefits cannot easily be summarized. Just as Goethe and Kant, Nietzsche, Mann and Rilke have made significant contributions to world culture, so the figure of Goethe's Faust stands beside Hamlet and Don Quixote as one of the great figures in Western literature.

Beyond its contribution to a liberal arts education, this major leads into teaching (at all levels: elementary, high-school, college and university) and toward the government's Foreign Service as well as into such channels, potentially, as the export and import trade with German-speaking countries (Germany, Austria, and Switzerland).

## GREEK (See Classical Studies)

## HISTORY

History seeks to develop insights on a particular body of human activity whether it be revolution in Russia, dictatorship in Napoleonic France, or the building of empires in the New World. To impart these insights courses in history strive to cultivate far-ranging minds and the kind of trained intellects that delight in pursuing a line of research or developing a good argument. As worthy components of a liberal education these courses espouse the view that the un-

examined life is not worth living and the unexamined world is not worth living in.

At Duke a major in history is planned to allow students almost complete freedom in choosing their courses within the framework of the University philosophy of undergraduate education. Normally all majors are required to take an introductory course in Modern History. In their remaining semesters of history, majors have considerable freedom of choice. The single mandatory stipulation is that two courses must be in an advanced seminar or on the senior-graduate level so that every student will have at least some opportunity for intensive investigation on a subject in an area of special interest. Beyond the work in history, the department urges majors in the department to broaden their understanding by exploring widely in the various disciplines other than history. The latitude provided within these requirements is perhaps best suggested by the increasing number of pre-medical students now majoring in history.

The History Department is in a position to offer an unusually wide range of subjects to prospective students, since all the fields offered by the Department are open to undergraduates. These fields are American (including Diplomatic, Colonial, 19th Century, 20th Century, the South, Civil War and Reconstruction, and Intellectual history), Western European (including Ancient and Medieval, the Renaissance, the French Revolution, 19th and 20th Century), English history and the British Commonwealth, Russian, Latin American, Indian and Pakistani, Far Eastern, Military and Naval history as well as the history of science.

In addition to the individual courses offered in the various fields, the History Department has introduced a special program of seminars with enrollment limited to no more than a dozen in each to encourage students who are interested in doing advanced reading and research. Specially qualified students may also do independent reading and research under the supervision of a member of the staff. A "Senior Seminar," is provided for superior students, particularly those working toward "Graduation with Distinction in History." But whether one qualifies for "Distinction" or not, a major in History should help prepare a thoughtful student to enter the many occupations in life which are open to graduates of a liberal arts college.

## LATIN (See Classical Studies)

## MATHEMATICS

Knowledge of the areas encompassed by mathematics and what this "science" has to offer can be gained from a discussion of its

three main branches: algebra, geometry, and analysis. The division known as algebra stemmed from arithmetic and now includes such fields as abstract algebra, group theory, and number theory. The algebra to which students are introduced in high school is a powerful tool for solving certain types of problems, but it is only one of the many types of algebra. Some of these various abstract algebras have found applications in the physical and social sciences.

The second branch of mathematics, geometry, had its origins in the space apperception of primitive man. The Greeks, combining space concepts with logical and abstract reasoning, developed a postulational or axiomatic system known as the Elements of Euclid. The Arabs added trigonometry to the field of geometry, and the French philosopher Descartes introduced the notion of coordinates, which permitted algebra to enter into the study of geometry. Differential geometry, which arose during the eighteenth century, played an important role in the development of Einstein's theory of general relativity. The first half of the nineteenth century saw the development of several non-Euclidean geometries. The newest subfield of geometry is that of topology. It treats those aspects of figures which do not change under deformation. This newest member of the geometry family came into being at the turn of this century and in the short time since its inception, has engulfed all classical geometries and has had a marked influence in many other areas of mathematics, as well as in such unrelated fields as medicine and psychology.

The third branch of mathematics is called analysis; it was initiated by Leibnitz and Newton towards the end of the seventeenth century. Here a new basic concept in mathematics was added, that of a limit. This has been one of the most fruitful concepts of man; e.g., we use it in rate problems and in finding the volumes of irregular bodies. Many, many developments in chemistry, physics, and other sciences can be traced directly or indirectly to the notion of a limit. A few of the subfields of analysis are calculus, real and complex function theory, differential equations, infinite series, and measure and integration theory.

The student selecting mathematics as a major can concentrate in any one of the three branches just mentioned, or he can select those courses in each branch which appeal to his own particular interests. To these fields should be added the field known as applied mathematics which is playing an increasingly important role in scientific and technological developments. The applied mathematician is interested in the development of mathematics for its own sake as well as in the application of mathematical methods in such fields as

engineering, physics, economics, and management. The student interested in applied mathematics should elect courses in analysis, computing, probability, statistics, and mathematical logic. He should also have a strong interest in a related field such as physics or economics.

In the senior year, a major may pursue independent study leading to Graduation with Distinction.

## MECHANICAL ENGINEERING
**(See Engineering Studies)**

## MUSIC

The study of music is usually approached through one of three different divisions of the field. Each of these may be considered a "specialization," but a well-balanced knowledge of all three is essential to the training of a fine musician. These branches are (a) musical performance, (b) musical theory and composition, and (c) music history and musicology.

In order to achieve highest competence in *musical performance* a solid background of technical discipline within a specified medium (for example, piano, violin, or flute) is necessary. This discipline can best be established in the early years and should be well developed at the time of college entrance. At whatever stage one decides upon the study of music, however, the acquaintance and technical mastery of an instrument is essential to the development of musical understanding. This should not be postponed.

The study of *musical theory* encompasses a thorough investigation of the styles and technical resources utilized in compositions which represent the continuity of musical development in Western civilization. Those which are still experimental and which may constitute bases for the art of the future are also studied. The student is encouraged to work with this material in original constructions.

*Music history and musicology* are branches of general historical study. The manifestations of a civilization in terms of its culture are as revealing as those of its politics. This field is not restricted to the prospective professional musician. Courses which cut across various historical periods and which consider music within the context of sociological, economic, and geographic milieu are designed for general students.

## PHILOSOPHY

Philosophy grows out of a group of questions and issues that are as old as our civilization. Most intelligent persons have pon-

dered them at some times in their lives. What sort of universe do we live in? Is it mental, physical, or both? Does it have some over-all purpose or plan? And what about man? Is there some purpose or meaning in life? Does man have free will or is his behavior determined? The philosopher seeks to answer these questions, or failing that, at least to understand them.

Gradually, there have arisen divisions, or major areas in philosophy, each of which can be studied in some isolation from the others. For example, questions of free will may raise questions about the nature of caused behavior, the nature of motivation, of choosing, of intending, and of thinking. These issues form a separate area which we call philosophy of mind. Again, the question of what our aims and purposes are or should be raises further questions which belong to the discipline we call ethics, which investigates such topics as the nature of moral standards, how they are established and justified, and with the analysis of such concepts as "good," "ought," and "right."

Philosophers in trying to answer these questions have found themselves raising in turn such questions as: How do we establish the truth of what we say? How do we test our beliefs? What constitutes good evidence? What is the difference between knowing and merely believing? This area in philosophy is called the theory of knowledge or epistemology.

When we offer answers to our questions, or offer the solution of a problem, we try to give reasons for our answers. We try to justify and show the soundness of our conclusions. The study of this activity is logic, a branch of the theory of knowledge. Logic deals among other things with the nature of arguments, the differences between sound and unsound reasoning. Out of it grows the investigation into the ways in which general principles or laws are established in the sciences, which we call inductive logic. Related to this is the study of the ways in which conclusions are established in legal arguments, in art criticism, and in evaluation.

Philosophy is old, inasmuch as philosophers have been working with these problems since the dawn of civilization. And yet philosophy is always new, since succeeding centuries encounter new problems and discover new ways of approaching the old. In the twentieth century, philosophy has discovered a new vantage point from which to examine its problems, that of the study of language, and the relations between language, thought and the world. Viewed from this new standpoint, many of the traditional issues can be seen clearly in a way that never was possible before. And yet the

contemporary emphasis on language, which reaches into nearly every corner of philosophy, gives rise to new and special problems of its own, which are studied in formal logic, semantics and the philosophy of language.

Here then are a few of the major areas in philosophy. Within them one can find subordinate and related studies such as philosophy of science, philosophy of art, philosophy of law, and philosophy of religion.

This brief sketch cannot do more than suggest the way in which the parts of philosophy grow out of and sometimes discard earlier parts; new issues, new fields develop in philosophy. Philosophy, moreover, is one of the few subjects which studies its own history. Part of the study of philosophy is the history of philosophy, that is, the study of what the great philosophers of the past, Plato, Aristotle, Aquinas, Kant, and Hume, to name a few, had to say on the fundamental issues, and, in fact, which issues they regarded as fundamental. Ancient philosophy is not outmoded because it is ancient any more than ancient art is outmoded.

Philosophy is self-conscious in a way that other disciplines are not. For it seeks a total view of things and in trying to answer its questions, it turns and investigates its own methods and techniques in giving answers. The philosopher, as it were, is always trying to look over his own shoulder to see what he is doing. In this awkward posture, he advances as best he can against the multitude of problems that beset him, while at the same time wrestling with the question "What is Philosophy?", perhaps the most difficult question of all. It will not then be surprising to learn that philosophy has always been controversial; despite large areas of agreement, there are many issues on which philosophers differ widely.

The major in philosophy offers an opportunity to study most of the areas within the discipline. It does not, in itself, lead directly to any career except teaching. But students planning a career in other areas will often major in philosophy because they wish to avoid specializing too soon, or because they recognize the general value of philosophic study in becoming aware of the methods, assumptions and goals of whatever field one works in, and because philosophy, by stressing this broad vision, contributes to the development of cultured and thoughtful individuals. Knowledge of philosophy has always been considered as part of the necessary equipment of any educated person.

In the senior year, a major may pursue independent study leading to Graduation with Distinction.

## PHYSICAL EDUCATION AND HEALTH

### The Woman's College

Physical education in some form is universal. It is inherently interesting to children of all ages and to most adults. It is a broad field covering many aspects of motor activity, such as sports, aquatics, gymnastics, the many forms of dance, and recreational activities.

To assure that positive good may result from programs of physical education, trained leaders are necessary. The major program in physical education in the Woman's College has as its purpose the developing of teachers whose understanding of human needs and behavior and whose knowledge of basic theory as well as skill in performance make them worthy leaders of youth.

The courses in the major program fall into three main categories: principles, methods and materials, and biological science. In studying the history and principles of physical education, the student discovers the part that physical education has played from the early Greek civilizations to the present time. She learns the place of sports, dance, aquatics, and gymnastics in American and European cultures of today. She studies the activity needs and interests of children of different ages and becomes familiar with the laws of learning as applied to the learning of movement skills. Problems of administration in school physical education, program planning, health, and safety are some of the topics studied in other theory courses.

The courses in methods and materials are directed primarily to the teaching of physical education in secondary schools, although teachers of other subjects or students in sociology and religious education find certain of these courses valuable as related work.

A strong background of biological science is also necessary for the major. A course in mammalian anatomy gives students an understanding of all the organ systems and emphasizes particularly the nervous, muscular, and skeletal systems of the human body. In kinesiology human movement is studied. Students review the mechanical principles which apply to human motion and discover the characteristics of movement essential to development of skill and conservation of energy. Physiology is included in order that students may understand the body functions as a basis for healthful living, and may engage in or lead activity with awareness of the effects of exercise on the human mechanism.

In addition, the major needs a broad general education. Courses in written and spoken English, literature, art, music, psychology, and sociology are especially desirable. The broader her educational

background and her understanding of people, the more valuable she becomes as a leader and teacher.

It is well for the student interested in the physical education major to indicate that interest early so that she may have ample time to take the prerequisite and required work in proper sequence.

## PHYSICS

Physics is concerned with the study of energy in all of its forms and with the structure of matter. Thus, the discipline encompasses all the fields touched on in the introductory course: mechanics, heat, optics, acoustics, electricity and magnetism, and atomic and nuclear physics.

Duke University has a full program for a major in physics. The sequence of courses is usually introductory physics, intermediate physics, intermediate mechanics and electricity, electronics, kinetic theory of gases and thermodynamics, advanced laboratory, electromagnetic theory and physical optics, and atomic and nuclear physics. The courses in electronics and electricity include laboratory work, and the advanced laboratory includes experimental studies in optics, solid state physics, atomic physics, and nuclear physics. As an undergraduate one does not specialize but explores the basic aspects of most areas in physics.

Senior majors who have demonstrated excellent laboratory ability may work directly with one of the graduate research groups of the Department. They may also pursue independent study and research in the program leading toward Graduation with Distinction. At all levels there exists the opportunity to become aware of the nature of the research being carried out in the Department. There are excellent research programs in the fields of nuclear physics, particle physics, the study of the structure of molecules and solids using both microwave and optical techniques, the properties of matter at temperatures approaching absolute zero, and theoretical physics.

Physics majors usually "minor" in mathematics, and are also expected to take a course in college chemistry, with a recommendation that additional work in chemistry be taken. As a whole, the work elected by the undergraduate major provides a desirably broad liberal arts base. This background is especially important for the person planning to become a professional physicist since he will soon become specialized.

## POLITICAL SCIENCE

The Department of Political Science seeks to convey an understanding of the philosophies, practices, and problems of government

and politics. Political science is concerned with the perennial effort to reconcile the claims of justice and power, liberty and authority. In pursuing this broad objective a variety of materials and approaches are used: historical, legal, institutional, philosophical and empirical. As a consequence, political science is a broadly-based social science, one sharing the aims of a liberal arts education as well as one evoking concern for an understanding of the public policy problems of our time. Although of benefit to those students seeking a broad, liberal education, the study of political science is likely to be of special usefulness to those interested in a career in law, business, journalism, teaching, government employment, and public relations.

The student majoring in political science begins with a course in American and European Political Systems. Although it is desirable for the student to elect course work in each of the three broad areas described below, he is given maximum opportunity to develop a departmental program suited to his own needs and interests.

In the area of *Political Theory and Comparative Government* courses are offered in political philosophy from Plato to modern times and in the governments of Europe, Asia, Africa, Latin America, and the Middle East. In the field of *American Government and Public Administration* attention is focused upon problems of constitutional law, civil liberties, the bureaucracy, governmental planning, metropolitan areas, and state government. Also emphasized are the less formal aspects of political activity, including political parties, voting behavior, pressure groups, and the process of decision-making. In the area of *International Law and Relations* the student may select from among courses concerned with international politics, organization, and law.

In all three areas attention is given to problems relevant to contemporary concerns, such as a comparison of democratic and totalitarian theories and practices, the politics of mature and underdeveloped nations, the relationships among various levels of government, controversial public policies in the domestic and foreign areas, the meaning of liberty, and the relationships of law and power both domestically and in the international arena.

A senior seminar open to qualified majors leads to the preparation of an honors thesis and to Graduation with Distinction.

## PSYCHOLOGY

Over the last half century the field of psychology has undergone an enormous expansion, stimulated in large measure by the demon-

strated practical value of psychology in a variety of areas of application. Intelligence testing, human engineering, public opinion polling, career counselling, motivational research, market surveys, and clinical interviewing all depend to some extent upon basic psychological knowledge.

Although these applications of psychology are important and interesting, it must be recognized that they *are* applications, that is, they draw upon the essential substance of psychology discovered in studies of general experimental psychology. Because of the widespread availability in the popular press of information on applied psychology, many beginning students do not have this idea, and are surprised when they discover in the introductory course that psychology does not deal primarily with applications to industry, mental health, academic adjustment, or with occult phenomena, but rather with a set of general scientific principles and the methods by which these principles are established.

In keeping with the importance of general experimental psychology, the psychology major at Duke University is designed to make sure that a student becomes acquainted with this basic field. This emphasis begins in the introductory course. In Introductory Psychology, he studies a series of standard topics which provide him with a survey of the materials which later courses cover in more detail. A student who enjoys the beginning course will probably find the major in psychology exciting.

Beyond the introductory course the student who majors in psychology is required to complete seven semester courses in psychology, including a one semester course in statistics. The courses not covered by specific requirements may be selected from such offerings as biological psychology, child psychology, tests and measurements, applied psychology, and social psychology.

For the major student who is interested and capable, the Psychology Department offers several opportunities for independent study. Certain intermediate-level courses entail the completion of a project, which involves experimental work. At more advanced levels there are two series of courses which allow the student to do independent study and research. One of these sequences leads to Graduation with Distinction in psychology.

## RELIGION

The Department of Religion represents a program of studies which is considered integral to a liberal education. While the existence of a vigorous and distinctive program of studies in religion

at Duke is largely to be explained historically by the relationship of the university to the Church, the present emphasis is upon the study of religion as an element of liberal culture and as one of the humanities. A clear distinction is made between the study of religion (the role of the Department of Religion) and the practice of it (the role of the Chapel and other campus ministries). Recognizing that confusion at this point has contributed to a situation that has driven the study of religion from the curriculum of many American universities and isolated the practice of religion from the main stream of university life, the Department is committed to historical, critical, and phenomenological methods of study which sustain its role as one of the humanities.

But this approach does not mean that some narrow "scientific" or "historical" viewpoint is adopted. Rather, studies in religion, like those in any of the other humanities develop according to the content of the subject matter, the personality training and proclivities of the teacher, and the receptivity of the student. The study of religion is approached as intellectual history, in which the professor seeks to exhibit in his sources certain expressions of the true mode of man's inner life and some of his deepest experiences. The teacher intends to show with imagination and sensitivity how a particular vision of life or system of thought looks from the inside, and in this process to open for himself and his students new possibilities for the understanding of human life. That is, the emphasis is upon a continuing creative apprehension of the past, as the past addresses itself to the present and anticipates the future. As in the case of literature, art, music, philosophy, and history, the study of religion lends itself to the possibility that something can be learned for the enlargement of the minds and lives of men.

Based upon concrete thinking about matters of cultural, academic, and religious importance, our curriculum is fixed upon the premise that the central force in the culture of which we are a product is, and has been, without doubt, Christianity. Hence the first objective of the study of religion is an understanding of what Christianity is. But this leads to the sources, or the primary literatures of the Old and New Testaments. The program of study begins for all students at this point, and expands into five areas of further study: 1) Biblical Studies; 2) History of Religions; 3) Church History; 4) Theology and Ethics; 5) Christianity and Culture. Every major in Religion participates through class study or directed readings and examinations in all of these areas, though he also emphasizes his special interest in one field.

A major in Religion would therefore be a live option for students whose vocational aim is law, medicine, scholarship, and teaching in religion, the various ministries of the Church, and many types of governmental and social service. It would also be an intelligent major for a student, not yet vocationally committed, whose concern in selecting a major is to assure a liberal education in the humanities tradition.

The program of studies in religion is designed to give coherence and structure to the work of majors, while also allowing majors and others maximum opportunity for accelerated study and personal achievement. The following facts are worthy of attention: (1) a 1 s.h. course (Religion 100), designed to help a student explore research techniques, is required of all majors and open to other students; (2) qualified juniors and seniors are encouraged to pursue independent reading with the possibility of earning substantial credit in this manner; (3) well-qualified majors, who aspire to Graduation with Distinction, are invited to participate in an independent study program beginning normally in the junior year; and (4) Senior Seminars, dealing intensively with a selected topic, are open to all qualified students.

## ROMANCE LANGUAGES

When a student elects to concentrate in French or Spanish, he has decided to study at some depth two important aspects of a particular culture: the language and the literature. At Duke, if he majors in one of these Romance languages, several courses in oral or written French or Spanish will extend and strengthen the skills of speaking and reading French or Spanish. He will devote the greater portion of his time and effort to the study of the national literature. Proficiency in the use of the language skills will therefore provide him with insights and appreciation of the literary works. The French or Spanish major will obtain a complete experience of the literature of his specialty by a judicious choice of courses ranging over the whole field of the literature. It goes without saying that this contact with the literary masterpieces will create appreciation of and sympathy for the people whose literature he is studying.

We believe, however, that the study of a national literature must be made within the perspective of the humanities and history. We therefore try to balance the major program by incorporating into it related study in history, philosophy, fine arts, and other literature.

A man or woman who majors in the humanities is by definition attempting to understand "man" and to prepare himself for an in-

telligent adjustment to the society of his fellow men. In deciding to concentrate in one or more foreign languages he can work toward this goal and also prepare himself for a possible career in government, industry, foreign commerce, and, of course, teaching.

Students majoring in Romance languages will find regular extra-class activities which put the practical knowledge of the languages to use: there are honorary societies as well as weekly, informal supper meetings of language groups, where conversation is carried on in French or Spanish; and every year students present a French play.

## SOCIOLOGY

As a systematic study of the network of human relationships that we know as society, sociology focuses inquiry on the various patterns and processes of man's associational life. The basic subject matter of sociology is human interaction, its form and content. Wherever people are in communication with each other, whenever direct or indirect contacts occur, sociologists find possible materials for their research. Analytic in its mode of description, sociology is concerned with the "how" as well as the "what" of human interaction. In their examination of social relationships sociologists seek not merely to chronicle human behavior, but also to account for it. They search out environmental conditions that produce, maintain, or change patterns and processes. They discover, trace, and measure lines of influence. This kind of analytic "mapping" of social situations and social trends provides a basis for prediction, and with prediction, possibilities of effective planning and control.

Since it shares with other behavioral sciences an ongoing metamorphosis from "natural history" to analytic description, sociology's claim to efficacy as a source of guidance to social reconstruction must necessarily be a modest one. Yet the trend to scientific status is there, and sociology joins other sciences in the persistent thrust toward effective knowledge. Although sociology encompasses an increasing variety of special subject matter, sociologists press for generalizations about human interaction that have wide ranges of applicability. They seek to develop theoretical formulations of simple, coherent linguistic construction to integrate the seemingly disparate specialized areas of study. At the same time they proceed to improve their techniques of observation and the processing of data. As man studies himself, and comes to know himself as he knows the world about him, there is promise that social problems, like physical and biological problems, will be brought to intelligent resolution. Such is the challenge, im-

plicit if not explicit, that is presented to those who pursue the study of sociology.

The Department of Sociology and Anthropology offers a varied program to the Duke undergraduates who wish to concentrate in the systematic study of human society. A general course serves to introduce the student to the field of sociology and to prepare him for further work in specialized areas. These include race relations, industrial relations, the family, the city, mass communication, and public opinion and propaganda. Other special areas of study include social stratification, social institutions, occupations and professions, the sociology of art, collective behavior and social movements, principles of social case investigation, social statistics, and social theory. These offerings in sociology are augmented by courses in the related field of anthropology.

As a further aid to concentration in sociology, the Department provides its majors with opportunities for some training in the skills needed in sociological research. Some are available through course offerings in methods of research, social statistics, and sociological theory, and others are found through the provision for undergraduate participation in research projects headed by staff members.

## ZOOLOGY

Zoology is that division of the broader field, biology, that deals with animals. As such, it shares the pervading atmosphere of excitement that characterizes modern biology. In the past decade the frontiers of biological research have been pushed so far forward that enthusiasts are predicting a "break-through" in biological knowledge comparable to that in atomic energy, with consequences which could be even more far-reaching.

The major in zoology reflects the nature of modern biology and is changed thereby. After the introductory course the student has a relatively free choice of courses appropriate to his interests and career plans. Other than the restriction that he must take one course in each of three areas, morphology, physiology, and genetics, any undergraduate or senior-graduate course in zoology may be counted toward the hours required for the major.

Many of the exciting recent advances in biological knowledge have come from the development of new techniques and the application of biochemistry, physical chemistry, physics, and mathematics to biological investigation. As a result, new areas such as biochemical genetics, biophysics, and molecular biology become largely

interdisciplinary. A modern zoologist must obtain both competence and understanding through adequate training in the other sciences. A good major will thus include, *as a minimum,* introductory calculus, a year of physics, and chemistry through organic. Furthermore, a student who wishes to take more advanced courses than these in the natural sciences and mathematics may substitute up to 6 s.h. of them toward the major.

Opportunities for interested and qualified undergraduates to assist in staff research are available throughout the Department. In the senior year, majors may pursue independent study leading to Graduation with Distinction.

This sheet must be mailed along with the "Information Sheet for Faculty Advisers" to the Admissions Office, Duke University, Durham, North Carolina, 27706, **no later than June 15. (Warning.** Some courses have a limited enrollment. Students who initiate registration after June 15 are less likely to be enrolled in courses of their first choice.)

Most of the information about academic requirements, course placement, and course selection appears in the accompanying ***Academic Guide.*** Semester hours for each course and other information can be obtained in the ***Bulletin of Undergraduate Instruction.***

If you list a special or x section of a course, or if you list courses at advanced levels, fill in a portion of the second tear sheet for each such course, stating your particular qualifications in that subject matter. If you are not sure of your placement within a given subject matter, give your best estimate based upon what you think your qualifications are. Your placement in these courses will be evaluated before you reach campus or during Freshman Week. Though you are advised to seek the level of your competence in the subjects for which you enroll, it is **not** advisable to register for more than one special section.

cut along this line

PRE-REGISTRATION FORM

Name ..... College .....

If known, choice of career..... Proposed departmental major.....

Please register me in the following courses that are described in the accompanying ***Academic Guide:*** (Note that English and physical education are already included. You must register for English 1 unless you earned advanced placement in English by virtue of a score of 4 or 5 in the APP.):

| PROPOSED COURSES | | | |
|---|---|---|---|
| Department or subject | Number of course | Semester hours* | RESERVE THIS SPACE FOR COMMENTS FROM YOUR DEAN OR ADVISER |
| English | | 3 | |
| ..... | | | ..... |
| ..... | | | ..... |
| ..... | | | ..... |
| ..... | | | ..... |
| ..... | | | ..... |
| Physical Education | 1 | 1 | |
| ..... | | | ..... |
| Total number of hours | | | |

*Not to exceed 18 hours (preferably 15-17)

Name ..... College .....

I believe that I am qualified for the following special section or advanced-level course:

| Department or subject | Number of course | Qualifications (APP, SAT scores, high school units or other indication of competence). |
|---|---|---|
| ..... | ..... | ..... |

I plan to take the following placement or qualifying test during Freshman Week:

Name ..... College .....

I believe that I am qualified for the following special section or advanced-level course:

| Department or subject | Number of course | Qualifications (APP, SAT scores, high school units or other indication of competence). |
|---|---|---|
| ..... | ..... | ..... |

I plan to take the following placement or qualifying test during Freshman Week:

Name ..... College .....

I believe that I am qualified for the following special section or advanced-level course:

| Department or subject | Number of course | Qualifications (APP, SAT scores, high school units or other indication of competence). |
|---|---|---|
| ..... | ..... | ..... |

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|---|---|---|
| ..... | ..... | ..... |

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This form must be mailed to the Admissions Office, Duke University, Durham North Carolina 27706, **no later than June 15.**

# BULLETIN
## OF
# DUKE UNIVERSITY




# The Divinity School

ANNOUNCEMENTS FOR 1964-65

VOLUME 36 MAY, 1964 NUMBER 7

# Annual Bulletins

For BULLETIN OF INFORMATION FOR PROSPECTIVE STUDENTS, apply to *The Registrar,* Duke University, Durham, N. C., 27706.

For BULLETIN OF UNDERGRADUATE INSTRUCTION, apply to *The Registrar,* Duke University, Durham, N. C., 27706.

For BULLETIN OF ENGINEERING, apply to *The Registrar,* Duke University, Durham, N. C., 27706.

For BULLETIN OF THE DIVINITY SCHOOL, apply to *The Dean of the Divinity School,* Duke University, Durham, N. C., 27706.

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For BULLETIN OF THE SUMMER SESSION, apply to *The Director of the Summer Session,* Duke University, Durham, N. C., 27706.

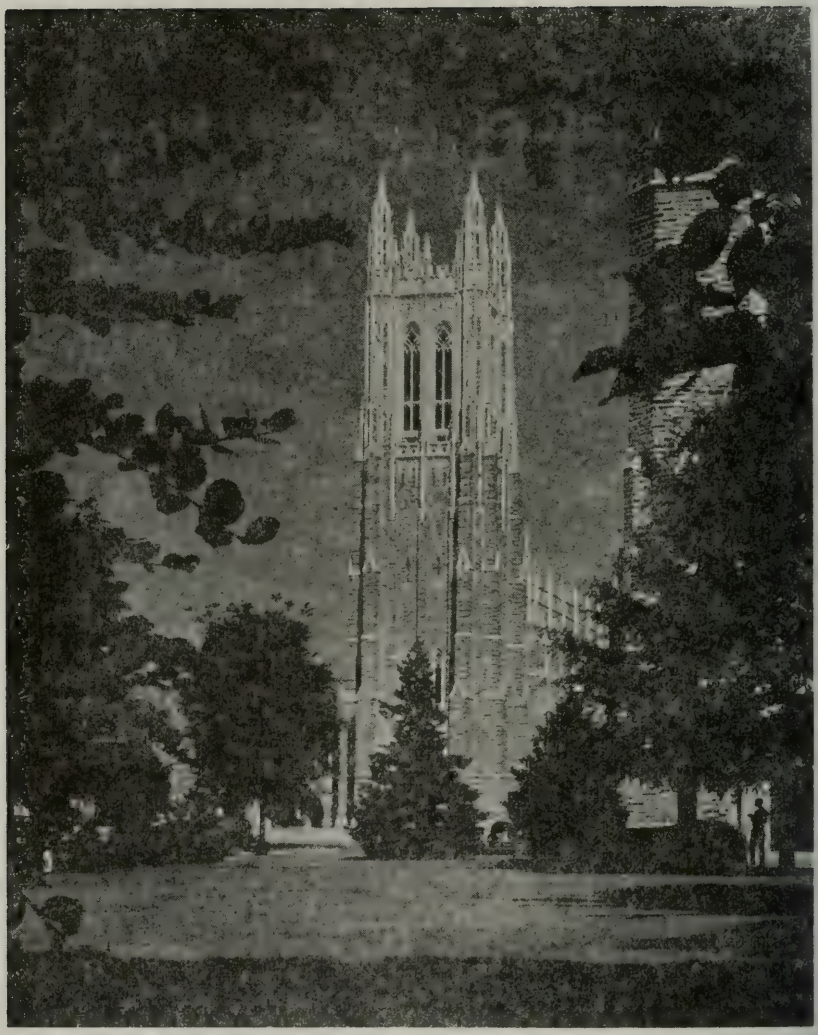
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# BULLETIN
OF
# DUKE UNIVERSITY

## THE DIVINITY SCHOOL

1963-64
ANNOUNCEMENTS FOR 1964-65

DURHAM, NORTH CAROLINA
1964



THE CHAPEL

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# Calendar

1964

| | |
|---|---|
| September 17, Thursday | Dormitories open for occupancy. |
| September 18, Friday | Junior Orientation begins. |
| September 21, Monday | 12:30 P.M.—Faculty luncheon.<br>4:00 P.M.—Faculty meeting.<br>7:30 P.M.—Dean's reception for new students. |
| September 22, Tuesday | 9:00 A.M.-1:00 P.M.—Registration of returning students.<br>9:00 A.M.-1:00 P.M.—Photographing of new students.<br>9:30 A.M.-10:30 A.M.—Library tours for new students.<br>2:00 P.M.-5:00 P.M.—Registration of new students. |
| September 23, Wednesday | 9:00 A.M.-1:00 P.M.—Completion of registration.<br>9:00 A.M.-11:00 A.M.—Library tours for new students.<br>11:00 A.M.-12:00 M—Physical examinations for new women students. East Campus Infirmary.<br>2:00 P.M.-5:00 P.M.—Placement tests for all new students. 125 Engineering Building.<br>6:00 P.M.-7:00 P.M.—Physical examinations for new men students. Out-Patient Clinic, Duke Hospital. |
| September 24, Thursday | 8:10 A.M.—Fall semester classes begin. |
| September 25, Friday | 10:10 A.M.—Opening Convocation. |
| September 30, Wednesday | 11:00 A.M.—Dean's Convocation of Junior class.<br>Last day for changing courses for the fall semester. |
| October 2, Friday | Dean's Faculty Coffee. |
| October 26-28, Monday-Wednesday | The Christian Convocation and Gray Lectures. |
| November 4, Wednesday | 11:00 A.M.—Dean's Convocation of Student Body. |
| November 6-8, Friday-Sun. | Conference on Ministry. |
| November 25, Wednesday | 5:30 P.M.—Thanksgiving recess begins. |
| November 30, Monday | 12:00 M.—Classes resume. |
| December 11, Friday | Founders' Day. |
| December 18, Friday | 5:30 P.M.—Christmas recess begins. |

1965

| | |
|---|---|
| January 4, Monday | 12:00 M.—Classes resume. |
| January 13-14, Wednesday-Thursday | Registration of resident students for the spring semester. |
| January 15, Friday | 5:30 P.M.—Fall semester classes end. |
| January 19, Tuesday | 2:00 P.M.—Final examinations begin. |
| January 29, Friday | 5:00 P.M.—Final examinations end. |
| February 2, Tuesday | Registration of new students. |
| February 4, Thursday | 8:10 A.M.—Spring semester classes begin. |
| February 10, Wednesday | Last day for changing courses. |
| March 26, Friday | 5:30 P.M.—Spring recess begins. |
| April 5, Monday | 12:00 M.—Classes resume. |
| April 19-29 | Pre-registration for Fall Semester. |
| May 5, Wednesday | 11:00 A.M.—Dean's address to Senior class. |
| May 19, Wednesday | 11:00 A.M.—Closing Convocation. |
| May 20, Thursday | 5:30 P.M.—Spring semester classes end. |

| | |
|---|---|
| May 24, Monday | 2:00 P.M.—Final examinations begin. |
| June 2, Wednesday | 5:00 P.M.—Final examinations end. |
| June 4, Friday | 10:30 A.M.—Faculty meeting. |
| | 12:30 P.M.—Faculty luncheon. |
| June 5, Saturday | Commencement begins. |
| June 6, Sunday | 11:00 A.M.—University Baccalaureate service. |
| | 7:45 P.M.—Divinity School Baccalaureate service. |
| June 7, Monday | Commencement—conferral of degrees. |

# Officers of Administration

Douglas Maitland Knight, Ph.D.
*President of the University*

Robert Taylor Cole, Ph.D.
*Provost*

Gerhard Chester Henricksen, M.A., C.P.A.
*Vice President for Business and Finance*
*Treasurer*

Everett Harold Hopkins, LL.D.
*Vice President for Planning and*
*Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B.
*Vice President for Institutional Advancement and*
*Assistant Provost*

Charles Edward Jordan, A.B., LL.D.
*Vice President for University Relations*

Herbert James Herring, A.M., LL.D.
*Vice President for Student Life*

Frank Traver de Vyver, Ph.D.
*Vice Provost*

Harold Walter Lewis, Ph.D.
*Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D.
*Dean of the Medical School and Vice Provost*

Benjamin Edward Powell, Ph.D.
*Librarian*

Richard Lovejoy Tuthill, Ed.D.
*University Registrar*

Craufurd David Goodwin, Ph.D.
*Secretary*

Edwin Constant Bryson, LL.B.
*University Counsel*

## *Emeriti*

Franklin Simpson Hickman, (1927) A.M., S.T.B., Ph.D., D.D.
*Professor Emeritus of Psychology of Religion*

Hiram Earl Myers, (1926) S.T.M., D.D.
*Professor Emeritus of Biblical Literature*

H. Shelton Smith, (1931) Ph.D., D.D., Litt.D.
*James B. Duke Professor Emeritus of American Religious Thought*

Hersey Everett Spence, (1918) A.M., B.D., D.D., Litt.D.
*Professor Emeritus of Religious Education*

Arley John Walton, (1948) B.S.L., D.D.
*Professor Emeritus of Church Administration and Director of Field Work*

## *Educational Administration*

Robert E. Cushman, (1945) B.D., Ph.D.
*Dean of the Divinity School*

Osmond Kelly Ingram, (1959) B.D.
*Dean of Students*

Harmon L. Smith, (1959) B.D., Ph.D.
*Assistant to the Dean*

Fletcher Nelson, (1964) B.D., Ph.D.
*Assistant to the Dean for Development*

Helen Mildred Kendall, (1950) A.B.
*Administrative Assistant and Registrar*

William Arthur Kale, (1952) B.D., D.D.
*Director of Field Education*

M. Wilson Nesbitt, (1958) B.D., D.D.
*Director of the Work of the Rural Church under the Duke Endowment*

Mattie Belle Powell, (1959)
*Administrative Secretary for the Work of the Rural Church*

### DIVISION OF ADVANCED STUDIES

McMurry S. Richey, (1954) B.D., Ph.D.
*Director of the Master of Theology Program*

Waldo Beach, B.D., Ph.D.
*Director of Graduate Studies in Religion*

### DIVISION OF SPECIAL STUDIES

Kenneth Willis Clark, (1931) B.D., Ph.D.
*Co-Director, International Greek New Testament Project*

Richard A. Goodling, (1959) B.D., Ph.D.
*Director of Instruction in Pastoral Care*

William A. Kale, (1952) B.D., Ph.D.
*Director of the Master of Religious Education Program*

### THE LIBRARY

Donn Michael Farris, (1950) B.D., M.S. in L.S.
*Librarian*

Harriet V. Leonard, (1960) B.D., M.S. in L.S.
*Reference Librarian*

Jean Vickers, (1958)
*Circulation Librarian*

Marlene G. Hanson, B.S.
*Assistant Circulation Librarian*

### SECRETARIAL STAFF

Becky L. Buie
*Secretary to the Dean*

Barbara Parchman
*Secretary to the Registrar*

Rose Marie Davis
*Secretary to the Director of Graduate Studies in Religion*

Martha Brown
*Secretary to the Dean of Students*

Renate G. Wend
*Secretary to the Assistant to the Dean*

Linda Jones
*Secretary to the Director of Field Work*

Linda S. Chandler
Mary Chestnut
Florence B. Watkins
*Faculty Secretaries*

# Faculty

P. Wesley Aitken, (1963) B.D., Th.M.
*Assistant Professor of Pastoral Care and Chaplain Supervisor*

Hugh Anderson, (1957) M.A., B.D., Ph.D.
*Professor of Biblical Criticism and Theology*

Frank Baker, (1960) B.D., Ph.D.
*Associate Professor of English Church History*

Waldo Beach, (1946) B.D., Ph.D.
*Professor of Christian Ethics*

Kenneth Willis Clark, (1931) B.D., Ph.D.
*Professor of New Testament*

Robert B. Claytor, (1963) B.D., Th.M.
*Instructor in Pastoral Care and Chaplain Supervisor*

James T. Cleland, (1945) M.A., S.T.M., Th.D., D.D.
*James B. Duke Professor of Preaching*

Robert E. Cushman, (1945) B.D., Ph.D.
*Professor of Systematic Theology*

James Michael Efird, (1962) B.D., Ph.D.
*Assistant Professor of New Testament*

Donn Michael Farris, (1950) B.D., M.S. in L.S.
*Associate Professor of Theological Bibliography*

Richard A. Goodling, (1959) B.D., Ph.D.
*Associate Professor of Pastoral Care*

Egil Grislis, (1959) B.D., Ph.D.
*Associate Professor of Historical Theology*

Thor Hall, (1962) B.D., Ph.D.
*Assistant Professor of Preaching and Theology*

John Kennedy Hanks, (1954) M.A.
*Associate Professor and Lecturer in Sacred Music*

Stuart C. Henry, (1959) B.D., Ph.D.
*Professor of American Christianity*

Frederick Herzog, (1960) Th.D. *
*Associate Professor of Systematic Theology*

Hans J. Hillerbrand, (1959) Ph.D.*
*Associate Professor of Modern European Christianity*

Osmond Kelly Ingram, (1959) B.D.
*Associate Professor of Applied Theology*

William Arthur Kale, (1952) B.D., D.D.
*Professor of Christian Education*

Creighton Lacy, (1953) B.D., Ph.D.
*Professor of World Christianity*

M. Wilson Nesbitt, (1958) B.D., D.D.†
*Associate Professor of the Work of the Rural Church*

Ray C. Petry, (1937) Ph.D., LL.D.
*James B. Duke Professor of Church History*

* On sabbatical leave. Fall Semester, 1964-65.
† On sabbatical leave. Spring Semester, 1964-65.

William Hardman Poteat, (1960) B.D., Ph.D.
*Associate Professor of Christianity and Culture*

McMurry S. Richey, (1954) B.D., Ph.D.
*Associate Professor of Theology and Christian Nurture*

Charles K. Robinson, (1961) B.D., Ph.D.
*Assistant Professor of Philosophical Theology*

John Jesse Rudin, II, (1945) B.D., Ph.D.
*Associate Professor of Speech and Worship*

Harmon L. Smith, (1962) B.D., Ph.D.
*Assistant Professor of Christian Ethics*

Robert E. Smith, (1960) M.D.
*Assistant Professor of Pastoral Care and Psychiatric Counsel*

William Franklin Stinespring, (1936) M.A., Ph.D.
*Professor of Old Testament and Semitics*

John Strugnell, (1960) M.A. (Oxon.)
*Assistant Professor of Old Testament*

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Harry B. Partin (1964) B.D., Ph.D.
*Lecturer in History of Religions*

William R. Steininger, (1960) B.D., S.T.M.
*Lecturer in Pastoral Care*

Herbert P. Sullivan, (1960) B.D., Ph.D.
*Lecturer in History of Religions*

Orval Wintermute, (1959) B.D., Ph.D.
*Lecturer in Old Testament*

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Paul M. Bassett, B.D.
*Teaching Assistant in Preaching*

Allen Freeman Page, B.D.
*Teaching Assistant in Greek*

Charles L. Rice, B.D.
*Assistant in Preaching*

# Divinity School Committees

## ADMINISTRATIVE

*Policy and Appointments:* Cushman, *ex officio,* Anderson, Beach, Kale, Petry, Richey, Stinespring.

*Endowment and Field Education:* Nesbitt, *ex officio,* Cushman, Ingram, Kale.

*Registration and Advanced Standing:* Cushman, *ex officio,* Ingram, Stinespring, Kendall, *ex officio.*

*Scholarships and Financial Aid:* Cushman, *ex officio,* Ingram, Kale, Nesbitt, Richey.

*Ministerial and Professional Qualifications:* Ingram, *ex officio,* Aitken, Goodling, Grislis, Hall, Kale.

## ACADEMIC AFFAIRS

*Academic Standing:* Cushman, *ex officio,* Efird, Farris, Grislis, Ingram, Hall, Kale, Stinespring, Kendall, *ex officio.*

*Admissions:* Cushman, *ex officio,* Goodling, Grislis, Ingram, Kale, Lacy, Robinson, Kendall, *ex officio.*

*Curriculum:* Henry, Grislis, Hillerbrand, Lacy, Petry, Poteat, Richey, Stinespring, Cushman, *ex officio.*

*Library Resources:* Grislis, Baker, Efird, Farris, Hillerbrand, Stinespring, Strugnell.

*Master of Theology:* Richey, *ex officio,* Goodling, Petry, Poteat, Strugnell.

*Master of Religious Education:* Kale, *ex officio,* Hall, Richey.

## JOINT AND SPECIAL COMMITTEES

*Alumni Affairs:* H. Smith, *ex officio,* Ingram, Lacy, Nesbitt.

*Chapel Worship and Christian Life:* Hall, Grislis, Hanks, Herzog, Rudin, H. Smith.

*Christian Responsibility and Cultural Trends:* Herzog, Lacy, Poteat, Richey.

*Community and Social Events:* Ingram, Baker, Clark, Cleland, Goodling, Grislis, Nesbitt, Rudin, Stinespring.

*Convocation:* Richey, *ex officio,* Cleland, Ingram, Farris, Hanks, H. Smith, *ex officio.*

*Divinity School Review:* Lacy, Baker, Farris, Hall, Hillerbrand, Robinson, Strugnell.

*Lectures and Public Events:* Cleland, Clark, Henry, Lacy, Poteat, Richey, Rudin, H. Smith.

*James A. Gray Lectures:* Cleland.

*Divinity School Seminars:* Clark, Richey, Poteat.

*Assembly Program:* H. Smith, *ex officio.*

*Missions Symposium:* Lacy.

*School of Approved Supply Pastors:* Kale, Henry, Ingram, H. Smith, *ex officio.*

*St. Michael's (Dumfries) Associates:* Cleland, Anderson, Ingram, Hall.

A quorum shall be sufficient to transact business of committees, or two-thirds present and voting.

# General Information

## HISTORICAL STATEMENT

THE Indenture of Trust signed on December 11, 1924, by Mr. James B. Duke, which established Duke University, mentioned first among its objects the training of ministers of the Gospel. The Divinity School was, accordingly, the first of the graduate professional schools to be organized. Its work began with the year 1926-1927, the formal opening exercises being held on November 9, 1926.

The Reverend Doctor Edmund Davison Soper was the first Dean of the Divinity School. He resigned in 1928 to become President of Ohio Wesleyan University, and was succeeded by the Reverend Doctor Elbert Russell, and the latter in turn in 1941 by the Reverend Doctor Paul Neff Garber. In 1944, Dean Garber was elected to the episcopacy of the Methodist Church, and Doctor Harvie Branscomb assumed the duties of the Dean's office. In 1946, Dean Branscomb became Chancellor of Vanderbilt University, and in 1947 the Reverend Doctor Paul E. Root was elected Dean but died before he could assume the office. The Reverend Doctor Harold A. Bosley became Dean in 1947 and resigned in 1950 to become the pastor of the First Methodist Church, Evanston, Ill. The Reverend Doctor James Cannon was appointed Dean of the Divinity School March 1, 1951. After a period marked by important administrative integration of the School, Doctor Cannon resigned the duties of deanship, September 30, 1958. The Reverend Professor Robert Earl Cushman was elected Dean and assumed the responsibilities of the office October 1, 1958.

## THE PURPOSE OF THE DIVINITY SCHOOL

The primary purpose of the Divinity School is to provide training for properly qualified persons planning to enter the Christian ministry. This includes not only prospective ministers in local churches, but also those preparing themselves to be missionaries at home and abroad, ministers of Christian Education, teachers of religion, and chaplains. Vital to all of these forms of service is a full understanding of the beginnings, content, and history of the Christian faith and its special pertinence for the spiritual needs of the modern world. Studies of a broad and thorough character directed toward such an understanding constitute the center of the curriculum of the Divinity School and are regarded as the basic training for all prospective Christian ministers. Specific instruction in the skills required of local ministers

and of leaders in the work of Christian Education is also provided. As funds become available for the purpose and as needs appear, additional training in specialized skills and areas of knowledge will be added to the curriculum.

Bound by ties of history and obligation to The Methodist Church, the Divinity School is ecumenical in its interests and outlook. Its faculty is limited to no one denomination, but draws upon the resources of them all. Students of the several denominations are admitted on an equal basis. The Divinity School conceives its task to be one of broad service to the Church in all of its forms.

## THE RELATION OF THE DIVINITY SCHOOL TO DUKE UNIVERSITY

The Divinity School is an integral part of the University and shares fully in its activities, privileges, and responsibilities. The Sunday services in the University Chapel give Divinity School students an opportunity to hear each year a number of leading ministers of the country. The University Libraries make easily accessible a rich collection of 1,650,000 volumes. Selected courses in the Graduate School of Arts and Sciences and in the professional schools are open to Divinity School students without payment of additional fees. The general cultural and recreational resources of the University are available to them on the same basis as to other students.

## COURSES OF STUDY OFFERED BY THE DIVINITY SCHOOL

The Divinity School offers three courses of study. The basic course is that which leads to the degree of Bachelor of Divinity. This is a three-year course and is recommended to all those preparing themselves for the work of the parish ministry. Students who hold pastoral charges, or other remunerative work requiring any substantial time apart from their studies, may carry only reduced schedules of work, and, in most cases, unless work is taken in the Duke University Summer Session, will spend four years in completion of the requirements for the B.D. degree.

The Divinity School offers study leading to the degree of Master of Religious Education. This course is designed for persons who wish to take specialized positions in the work of Christian Education. The course does not provide a general preparation for the work of the regular ministry and cannot serve as a substitute for it. No exchange of credits between the two courses is permitted, nor can departmental courses taken be credited toward more than one degree.

A new program of study leading to the degree of Master of Theology (Th.M.) was instituted in the academic year 1960-1961. This course is planned to afford a limited number of superior students an

opportunity for intensive theological study beyond the B.D. degree. It is a terminal professional degree, ordinarily to be completed in a year, and not to be regarded as leading toward a doctorate.

The requirements for each of these degrees are stated on page 27 through 41 of this catalogue.

## COURSES OF STUDY IN RELIGION OFFERED BY THE GRADUATE SCHOOL OF ARTS AND SCIENCES

Students who desire to pursue studies in religion leading to the degrees of Master of Arts or Doctor of Philosophy in Religion should register in the Graduate School of Arts and Sciences. Study and research may be pursued in three fields: (1) Biblical Studies; (2) Historical Studies, and (3) Systematic and Contemporary Studies. A list of courses approved by the Graduate Faculty for work in these fields, together with general requirements for admission to the Graduate School, may be found in the *Bulletin of the Graduate School.* This Bulletin is available on application to the Dean of the Graduate School of Arts and Sciences, Duke University.

A limited number of University Scholarships and Fellowships, among which are three Gurney Harriss Kearns Fellowships, ranging from $2,000-$3,000, as well as Rockefeller Doctoral Fellowships in Religion, Woodrow Wilson Fellowships and Kent Fellowships. Applications for these must be submitted to the Dean of the Graduate School on University forms not later than February 15 of each year.

Inquiries concerning specific requirements of the Program of Religion in the Graduate School should be addressed to Professor Waldo Beach, Director of Graduate Studies in Religion.

## LIBRARY RESOURCES

The Divinity School Library, containing a collection of more than 114,000 volumes in the field of religion and closely related disciplines, affords an unusual wealth of material for the seminary student. Although it is an integral part of the University's nine-unit library system which possesses more than 1,650,000 books, the Divinity School Library has its own separate facilities in the Divinity School building. Its book collection is operated on the open stack system; and its reading room provides study facilities for students and housing space for the special reference collection in religion and for the current numbers of the more than 350 religious periodicals to which the Library subscribes.

Staffed by a Librarian and a Reference Librarian who are trained in theology as well as in library administration, and by an experienced Circulation Librarian who is aided by a full-time assistant and a number of student assistants, the Divinity School Library offers a

variety of reference services to assist the student in selecting and locating materials. The staff, in cooperation with the faculty, maintains a book and periodical collection to support both basic courses and advanced research in all major fields of religious studies.

The Divinity School Library is adjacent to the General Library and is internally connected with it by a corridor which gives easy access to its many departments. The seminary student is permitted to withdraw books from the collection of more than 1,000,000 volumes in the General Library, and to make use of its other resources and facilities which include manuscripts, archives, public documents, newspapers, periodicals, microfilm, maps, rare materials (among which are twenty-six prized ancient Greek manuscripts), reference assistance, and provision for the borrowing of books not in the Duke Libraries from the Library of the University of North Carolina and other institutions.

## THE HENRY HARRISON JORDAN LOAN LIBRARY

Henry Harrison Jordan, distinguished member of the Western North Carolina Conference (1862-1931) was memorialized by his children in the establishment of an endowment in 1947. The Divinity School Librarian is the custodian of books purchased under this fund for loan, through postal services, to qualified ministers of all denominations or localities. The Jordan Loan Library undertakes to maintain a catalogue of up-to-date publications representative of the several theological disciplines and areas of the minister's professional interest. Books are loaned on application to the Librarian of the Divinity School from a printed catalogue supplied on request.

## ORMOND MEMORIAL FUND

Established 1924 by Dr. J. M. Ormond, '02, and Mrs. Ormond, in memory of his mother and father, Mr. and Mrs. J. J. Ormond; the income to be used for the purchase of a collection of books on the rural church for the Library of the Divinity School at Duke University.

## AVERA BIBLE FUND

Established 1895 by gift of Mrs. L. B. McCullers in memory of her husband, Willis H. Avera; the income to be used for the purchase of books for the Divinity School Library.

## LOUIS W. BAILEY MEMORIAL FUND

This memorial fund was established in 1958 by the Reverend A. Purnell Bailey in memory of his father. The income is to be used for books for the Divinity School Library.

## THE WILLIAM ARTHUR KALE, JR., MEMORIAL FUND

William Arthur Kale, Jr. was a member of the Duke University class of 1958, a lover of sacred art and music, and a member of the University Chapel Choir. In his memory there was established in 1964, by the provision of his parents, Professor and Mrs. William Arthur Kale, Sr., a fund for the purchase of books and other materials in the area of fine arts and religious musicology for the perpetual enrichment of the holdings of the Divinity School Library.

## CORPORATE WORSHIP

One of the most important aspects of a program of training for Christian service is warm and discriminating common prayer. The center of the corporate life of the Divinity School is its own place of worship, York Chapel. Regular chapel services are held, at which all students are expected to be present. Services are led by members of the faculty, by visiting ministers, and by members of the student body. Prayer groups are held in the dormitories weekly and special groups during the Lenten Season.

## PUBLIC LECTURES

The Committee on Lectures and Public Events presented the following lecturers (with their topics) during the year 1963-64: Dr. Lester A. Welliver, the Judicial Council of the Methodist Church ("The Work of the Judicial Council"); Professor Charles Stinnette, the Divinity School of the University of Chicago ("The Pastoral Ministry in Theological Perspective"); Professor Ragnar Bring, the University of Lund, Sweden ("Conditions for Preaching in an Atheistic Age"); Professor Darrell Randall, Chairman of the Africa Area Studies Program, American University ("What is the Matter with the new Nations"); President Douglas Knight, Duke University, "The Poet as Prophet: Art and Religious Insight." The third Faculty Lecture was delivered by Dr. William F. Stinespring ("Temple Research in Jerusalem"). In "Reflections on Vatican II, the Second Session," Dean Robert E. Cushman offered a lecture on the Vatican Council, February 5, 1964.

## THE JAMES A. GRAY LECTURESHIP

The James A. Gray Lectures were established in 1950 as part of the fund set up in 1947 by Mr. James A. Gray of Winston-Salem, North Carolina. This lectureship was once again delivered in connection with the Ministers' Convocation, held at the University in the fall. The lecturer in 1963-64 was the Reverend Professor Joseph Sittler, the Divinity School of the University of Chicago. His subject was "Reflections on Nature and Grace." Father Godfrey Diekmann of St. John's Abbey, Collegeville, Minnesota, will deliver the 1964-65 lectures October 26-28, 1964.

## THE DIVINITY SCHOOL LIBRARY LECTURESHIP

In 1948 the Duke Divinity School Library Lectures were established by the Reverend George Brinkmann Ehlhardt for the purpose of bringing to the Divinity School a succession of religious leaders. The lecturer for 1963-64 was the Reverend Dr. G. Henton Davies, Principal of Regent's Park College, Oxford, England. His subject was "Amos and Jerusalem."

# Program of Continuing Education

## DIVINITY SCHOOL SEMINARS

THE Divinity School, with the support of the James A. Gray Fund, conducts each year a series of extension Seminars consisting of two-day study courses for Divinity School alumni and other ministers. In 1963-64 three Seminars were held as follows: Columbia, S. C., in Main Street Methodist Church (November 11-12, 1963); Charlotte, N. C., in First Methodist Church (January 20-21, 1964); and Raleigh, N. C., in Edenton Street Methodist Church (January 23-24, 1964). The subject presented in all three Seminars was "The Meaning of Salvation."

Lecturers were Dr. Thor Hall, Assistant Professor of Preaching and Theology in the Divinity School of Duke University; Dr. John David Maguire, Assistant Professor of Religion in Wesleyan University (Connecticut); Dr. William Barr Oglesby, Jr., the Marthina DeFriece Professor of Pastoral Counseling in Union Theological Seminary in Virginia; and Dr. Charles Roy Stinnette, Jr., Professor of Pastoral Theology in the Divinity School of the University of Chicago.

Projected for 1964-65 are Seminars in Columbia, S. C., at Washington Street Methodist Church (November 9-10, 1964); Greensboro, N. C., at West Market Street Methodist Church (January 18-19, 1965); and Fayetteville, N. C., at Hay Street Methodist Church (January 21-22, 1965). The subject will be: "Current Interpretation of the New Testament."

Lecturers will be Dr. Hugh Anderson, Professor of Biblical Criticism and Theology in the Divinity School of Duke University; Dr. Howard Clark Kee, Professor of New Testament in Drew University; and Dr. Krister Stendahl, the Frothingham Professor of Biblical Studies in the Divinity School of Harvard University.

## THE CLINIC IN PREACHING

The Clinic in Preaching will again be offered in the summer of 1964, July 20-July 31, under the direction of Dr. Thor Hall, for 18 ministers who are active in the pastoral ministry. No academic credit will be given.

## THE CLINIC IN PASTORAL CARE

The Clinic in Pastoral Care is offered under the direction of Professors Richard A. Goodling and Robert E. Smith and assisted by the

Chaplains in the Medical Center and will be held July 20-July 31, 1964. Through lectures, group discussions, and hospital visitation experiences, explorations are made of the meaning of selfhood, the self in crisis, and the ministry to those caught in the crisis of illness. Registration is limited to twenty ministers of any denomination who hold the B.D. degree. No academic credit will be given.

## THE RURAL CHURCH CLINIC

A Rural Church Clinic will be held July 20-July 31, 1964, under the direction of Professor M. Wilson Nesbitt. Twenty to twenty-five participants will engage in two weeks of intensive training, study, and planning in some phase of the "Church's Program in the Rural Community."

Registration is open to all persons interested in the program of the rural church. No academic credit will be given.

## THE SCHOOL FOR SUPPLY PASTORS

In cooperation with the Department of In-Service Training of the Board of Education and the Southeastern Jurisdictional Conference of The Methodist Church, Professor W. A. Kale directs for the Divinity School a School for Supply Pastors of The Methodist Church and others taking the Methodist course of study for ministers. This school is in session for approximately four weeks each summer, and the required studies for one full year can be completed in this period. This is not a part of the regular work of the Divinity School and no credit toward a seminary degree can be earned. The faculty includes representatives from the Divinity School and other church-related institutions plus selected leaders of nearby Annual Conferences. The sixteenth session of the Supply Pastors' School is scheduled for July 13-August 7, 1964.

## FACILITIES FOR ADVANCED STUDY IN THE AMERICAN SCHOOLS OF ORIENTAL RESEARCH

The Divinity School of Duke University is one of the supporting members of the American Schools of Oriental Research. Accordingly, students in the Divinity School have the privilege of attending the American School in Jerusalem or the one in Bagdad without charge for tuition. They may also compete for the financial aids which are offered annually by the Schools. These consist of four fellowships, the stipends depending upon available funds.

# Student Life

## DIVINITY SCHOOL CHOIR

A student organization of long standing is the Divinity School Choir. Membership in the Choir is open to all qualified students. The Choir sings regularly for the daily services in York Chapel and at special seasonal programs and services. New members are chosen by informal auditions held during the first week of fall classes. Auditions are arranged for all who are interested.

## THE COORDINATING COUNCIL FOR COMMUNITY LIFE

Beginning with the 1964-65 academic year the Student Government Association is superceded by a Coordinating Council for Community Life. This Council is composed of representatives from the student body, faculty, administration, Divinity Dames, and the doctoral students in religion.

The purpose of the Council is, as the name implies, to coordinate the activities of the Divinity School community. Realizing that there are many shared interests and concerns within the community which cannot be expressed fully in a student body organization alone, the Council was created by a joint student-faculty committee and approved by participating groups.

The shared interests and activities of the community are expressed through the several committees of the Council. The Council has coordinating, reviewing, and initiating powers in matters affecting the common life.

Student members of the Council are elected by the three B.D. classes, the M.R.E. candidates, the Th.M. candidates and the student pastors. A student activity fee is collected at the beginning of each academic year to support the activities of the community. The fee, in recent years, has been six dollars ($6.00). The funds are administered through committees and are spent on such projects as missions, social action, social events, and student publications.

## DIVINITY DAMES

The wives of Divinity School students have an organization through which there is opportunity for informal fellowship during the period of the students' residency. For the past several years lecture courses, running for two-week periods in the fall and spring semesters, have provided instruction in various aspects of parish life

and in theological and Biblical subjects and issues. The dean and faculty are concerned to assist the wife to understand her husband's vocation and to participate appropriately.

## STUDENT PUBLICATIONS

In cooperation with the Dean's Office, students publish a faculty and student *Directory*. Under their editorship is published a monthly paper entitled *Response*.

# Admission and Requirements for Degrees

## *Requirements for Admission*

THE Divinity School is a fully accredited member of the American Association of Theological Schools, and is one of twelve accredited seminaries of The Methodist Church. Candidates for admission must hold the degree of A.B., or its equivalent, based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and their college records must be such as to indicate their ability to carry on graduate professional studies. They will be admitted without examination on presentation of an official, satisfactory transcript of college and all other academic credits which they may have secured. Recommendations from five responsible persons are required. Women will be admitted on the same basis as men.

Applications are evaluated with a view both to the academic achievement of the candidate and with reference to his personal and professional qualifications for the Christian ministry. While an academic average of less than "B−" is ordinarily regarded as a disqualification for admission, nevertheless, the Committee on Admissions is impressed with a rising curve of achievement in the undergraduate program and makes its decision on the basis of the whole body of credentials of an applicant, including supporting letters of reference.

The applications of students from foreign countries will be considered, each on its own merits, the general principle being that training equivalent to that of a baccalaureate degree from an accredited American college must have been secured.

In addition to an adequate academic preparation, applicants must satisfy the Faculty as to their Christian character and purpose. A formal application blank may be secured from the office of the Divinity School. This must be filled out and returned by all candidates for admission. Applications received after May 1 cannot be assured of admission, financial aid or dormitory rooms for the ensuing academic year. *A minimum of thirty days is required to process any application, in many cases longer.*

All persons admitted to the Divinity School are required to report

to the Student Health Service, Duke Hospital, for physical examination on days and at hours specified at the time of matriculation. No admission is final until approved by the Student Health Service, which requires a certificate of immunization and general health to be submitted not earlier than July 1 and not later than August 1. Applicants are also required to take certain tests administered by the Bureau of Testing and Guidance and by the Theological School.

Persons who do not matriculate at the time for which they were originally admitted forfeit admission and must be formally readmitted. A student who withdraws from the Divinity School and desires to return at a later date must file with the Dean a written request for a leave of absence.

Applicants are required on notification of admission to signify their acceptance within three weeks, and to pay an admission fee of $30.00. (Make check payable to Duke University and send to the Office of the Dean of the Divinity School.) This fee is applied to the regular first-term bill if the student matriculates; if he fails to do so, the fee is forfeited. This does not apply to the Summer Session.

Under the terms of the Selective Service Act, as it now stands, pre-enrollment for later formal admission may be granted to persons who meet the Divinity School standards and requirements for admission. Applications for pre-enrollment may be addressed to the Office of the Dean. Pre-enrolled students must send transcripts of each year's college work by June 15th of each year in which they are pre-enrolled. *Pre-enrollment does not guarantee final admission,* and a person who has been pre-enrolled for any length of time must send a transcript of work by February 1 of the year in which admission is sought. This must be accompanied by a letter from the college dean or other approved reference certifying to continued academic acceptability, good character and conduct.

## PRE-SEMINARY CURRICULUM

The Divinity School, in substantial agreement with the standards of the American Association of Theological Schools, recommends that prospective candidates for admission keep in mind the desirability of including the following in their undergraduate curriculum:

It is suggested that a student should acquire a total of 90 semester hours or complete approximately three-fourths of his college work in the areas listed below. No work done towards a first college degree may be used toward a Divinity School degree.

| *Basal Fields* | *Semesters* (At least the number indicated) |
|---|---|
| English<br>Literature, composition and speech, and related studies | 6 |
| History, ancient, modern European, and American | 3 |
| Philosophy, orientation in history, content and method | 3 |
| Religion | 3 |

| | |
|---|---|
| Psychology | 1 |
| A foreign language | 4 |
| Greek, Latin, Hebrew, French and German are especially recommended. | |
| Natural Science | 2 |
| Fundamentals of Speech | 1 |

## TRANSFER OF CREDIT

Transfer of credit from theological schools accredited by the American Association of Theological Schools is provided for by the Faculty of the Divinity School under certain conditions. Applications for transfer of credit will be ruled upon by the Committee on Admissions, and will be subject to evaluation in terms of the prevailing requirements of the Divinity School for graduation. *Ordinarily, credit from another institution will not be granted in amount exceeding one-half of the total credits required by the Divinity School for graduation.* A student applying for transfer of credit in excess of this amount may be required to pass such examinations as the Committee on Admissions may prescribe. In each case a letter of honorable dismissal from the school from which transfer is made is required along with transcript of academic credits.

## ADVANCED STANDING

Advanced standing allows entering students to begin work in any given field at a level higher than that of the core curriculum, or to substitute a specialized or cognate course for a core requirement.

Entering students with substantial undergraduate preparation in areas closely related to required courses of the Divinity School core curriculum may be eligible for advanced standing. While a student may be eligible for advanced standing in any subject, it is especially pertinent where students offer undergraduate majors of superior quality in Bible, religion, or philosophy. Students entering with six or more semester hours in the Greek language should consult the catalogue under "Language Study" for a description of special privileges pertaining to their case. The fields in which entering students, by virtue of previous undergraduate study, are most likely to qualify for advanced standing are: Old Testament, New Testament, Types of Religious Philosophy, Church History.

An entering student who offers not less than *six* semester hours of college credit, with a grade of "B" or better in one or more of these areas may ordinarily anticipate advanced standing in corresponding required courses of the Divinity School core curriculum. All final transcripts will be studied, and advanced standing will be accorded to those who qualify under this provision.

A student who offers not less than three semester hours of college credit with a grade of "B" or better in one or more of these areas may,

for satisfactory performance in a qualifying examination in the discipline, be granted advanced standing. Entering students who qualify, under this provision must, at the time of application, make request for the privilege of sitting for such an examination.

The core requirement for the entering, or junior student, with advanced standing is ordinarily satisfied by one of the following substitutions:

For Old Testament 11: O.T. 101; 106 A, B, C, D; 196; 201; 202.
For New Testament 18: N.T. 103, 104; 105; 109; 116 A, B, C, 117 A, B, 225.
For Types of Religious Philosophy: T.S. 16.
For Church History 13: C.H. 137; 138; 331; 332.
For Church History 14: C.H. 85; 250; 330.

## ADMISSION ON PROBATION

1. Applicants for admission who are graduates of non-accredited colleges will be considered on their merits. Ordinarily, such applicants must show that they have attained a superior average for a four-year college course.

Admission of such persons will, in every case, be *on probation.*

2. Applicants for admission who are graduates of accredited colleges but whose college transcripts do not fully meet Divinity School standards may be admitted *on probation* if their recommendations otherwise justify admission.

Probation means:

a. Students who, during the first year of Divinity School work maintain less than a "C" average, including one or more failures, ordinarily will be required to withdraw from the School.

b. Students admitted on probation may carry only limited schedules of work, the amount to be determined by the Dean of Students.

c. A student admitted on probation ordinarily shall not be admitted for advanced standing.

Students whose work after admission is not satisfactory may be placed on probation.

## MINISTERIAL AND PROFESSIONAL QUALIFICATIONS

All students who are admitted to academic study in The Divinity School are subject to the established order of administrative regulations of the University and the accepted standards of personal conduct it enjoins. Continuance in the School is conditioned upon acknowledgment of and compliance with such regulations and standards.

In particular, the University and the Divinity School expect and

require students in candidacy for degrees, leading to a ministerial vocation, not only to exemplify the dignity of their calling, but to exhibit attitude and conduct conformable with the recognized standards of their Christian profession. While no "honor system" relating to academic integrity is formalized within the Divinity School, application for and admission to course of study carries with it the student's assent to full compliance with recognized standards of integrity in the fulfillment of academic tasks.

On this prior understanding, therefore, the University reserves the right, and matriculation by the student is a concession to this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge is made against the student.

As a graduate professional school of theology, the Divinity School expects, on the part of the student, an increasing manifestation of maturity and professional purposiveness in discharge of personal and academic responsibilities appropriate to the level of advanced academic work leading to the high and exacting demands of the Christian ministry. Since personal and professional qualifications for the ministry will be considered in evaluating the candidacy of all students for degrees, students whose persons, progress, or development indicate that they are not suited to the work of the ministry will not be allowed to continue in the School.

## FACULTY ADVISERS

Each entering student is assigned to a Faculty Adviser at the time of registration and must report to his Adviser. A student must consult with his Adviser in order to determine his course and cannot complete his registration without the signature of his Adviser. It is understood that all students will continue to consult their advisers at the time of registration throughout the period of their academic work.

## ENGLISH DEFICIENCY

Students whose English testing scores show marked deficiency or who are reported by their instructors as deficient in English usage will be required to take Remedial English in addition to meeting other requirements for the Bachelor of Divinity degree.

## SPEECH DEFICIENCY

At any time in his academic course—on evidence of deficiency in the fundamentals of speech, such as voice or diction—a student may be required to enroll for Speech 34, Workshop in Communication.

Advanced standing does not apply to Professional Courses listed as requirements for Vocational Groups.

# Requirements for the Degree of Bachelor of Divinity

Course requirements are of three kinds: Those of the core curriculum, professional courses, and practicums related to field work. Courses of the core curriculum are required of all students; the professional courses required vary with the prescription of the five Vocational Groups. Practicums are required of students engaged in regular or summer field work.

## REQUIREMENTS FOR THE JUNIOR YEAR

1. Courses of the Core Curriculum.

| | | |
|---|---|---|
| O.T. 11. | Introduction to the Old Testament I | 3 s.h. |
| C.H. 13. | History of the Church to the Protestant Reformation | 3 s.h. |
| C.H. 14. | History of Modern European Christianity | 3 s.h. |
| N.T. 18. | Early Christian Life and Literature | 3 s.h. |
| *T.S. 20. | Types of Religious Philosophy | 3 s.h. |
| H.T. 21. | Theology of the Protestant Reformation | 3 s.h. |

2. Professional Courses.

| | | |
|---|---|---|
| P.S. 10. | I. The Church and the Minister's Vocation | 1 s.h. |
| P.C. 26. | II. Introduction to Pastoral Care | 3 s.h. |
| C.W. 40. | VII. The Church at Worship | 3 s.h. |

Required of all students of the Junior Year

3. Field Work Practicums.

| | | |
|---|---|---|
| Field Work Practicum I (For Student Pastors) | | 1 s.h. |
| Field Work Practicum II (For Summer Endowment) | | 1 s.h. |

## REQUIREMENTS FOR THE MIDDLER YEAR

1. Courses of the Core Curriculum.

| | | |
|---|---|---|
| O.T. 12. | Introduction to the Old Testament II | 3 s.h. |
| N.T. 19. | Introduction to New Testament Theology | 3 s.h. |
| †W.C. 24. | Philosophy of the Christian World Mission | 2 s.h. |
| C.E. 27. | Christian Ethics | 3 s.h. |
| A.C. 28. | History of American Christianity | 3 s.h. |
| C.T. 32. | Christian Theology I | 3 s.h. |
| C.T. 33. | Christian Theology II | 3 s.h. |

2. Professional Courses.

| | | |
|---|---|---|
| C.Ed. 22. | IV Theology and Christian Nurture | 3 s.h. |
| Pr. 29. | III Sermon Construction—Theory | 2 s.h. |
| Pr. 30. | V Sermon Construction—Practice | 1 s.h. |

Professional Course III required of all students in Vocational Groups I, III, IV, V, VI, and, on occasion, II.

* Advanced Standing entitles the student to elect C.C. 16 *Contemporary Western Culture.*
† Required of Vocational Groups I, II and III.

Professional Course IV required of all students in Vocational Groups, I, II, III, and VI. Professional Course V required of all students in Vocational Groups I, III, IV, V, VI, and, on occasion, II.

## REQUIREMENTS FOR THE SENIOR YEAR

I. Professional Courses.

| | |
|---|---|
| C.P. 23. VI The Care of the Parish | 3 s.h. |
| Pr. 31. VIII Preaching (practice) | 1 s.h. |

Professional Course VI is required of students in Vocational Groups I, II, and IV.

Professional Course VII is required of students in Vocational Groups I, II, III, IV, and VI.

Professional Course VIII is required of students in Vocational Group I.

II. Vocational Groups.
Each student, not later than the end of the junior year, shall choose one of the five Vocational Groups listed on pages 32 and 34 and will meet the vocational requirements of the group chosen.

III. Vocational Qualifying Finals.
Each senior student shall complete his academic program during his senior year by registering for and fulfilling the requirements of the qualifying final discipline pertaining to his chosen vocational group. For description see pages 34 and 35.

IV. Free Electives.
The student will choose a sufficient number of courses to make up the total of 90 semester hours required for graduation. Language courses count as free electives.

V. English Bible. A knowledge of the content of the English Bible requisite to the discharge of the teaching and preaching task of the Christian ministry is required and will be tested. Such proficiency must be demonstrated by the end of the student's senior year. Successful completion of Old Testament English Bible I and New Testament English Bible II (see pp. 42, 43) fulfill this requirement. A student may, however, sit for the final examinations in these courses and by passing them fulfill the requirement, in which latter case he receives no academic credit.

# *Suggested Distribution by Semesters of Required Courses*

## FIRST (JUNIOR) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 10. I The Church and Minister's Vocation | 1 |
| 11. Introduction to the Old Testament I | 3 |
| 13. History of the Church to the Protestant Reformation | 3 |
| 18. Early Christian Life and Literature | 3 |
| 20. Types of Religious Philosophy* | 3 |
| Field Work Practicum I (Student Pastors) | 1 |

| *Second Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 14. Modern European Christianity | 3 |
| 21. Theology of the Protestant Reformation | 3 |
| 26. II Introduction to Pastoral Care | 3 |
| Field Work Practicum II (Summer Field Work) | 1 |
| 40 The Church at Worship | 3 |

15 hours is the normal program, not over 16 hours may be scheduled in either semester.
*Students with Advanced Standing may enroll in C. C. 16, *Contemporary Western Culture.*

## SECOND (MIDDLER) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 19. Introduction to New Testament Theology | 3 |
| 24. Philosophy of the Christian World Mission† | 2 |
| 28. History of American Christianity | 3 |
| 29. III Sermon Construction—Theory | 2 |
| 32. Christian Theology | 3 |

| *Second Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 12. Introduction to the Old Testament II | 3 |
| 22. IV Theology and Christian Nurture | 3 |
| 27. Christian Ethics | 3 |
| 30. V Sermon Construction—Practice | 1 |
| 33. Christian Theology | 3 |

Professional Courses I and II required of all students.
Professional Course III, required of Vocational Groups 1, 3, 4, 5, 6, and on occasion 2.
Professional Course IV, required of all students in Vocational Groups 1, 2, 3, and 6.
Professional Course V, required of all students in Vocational Groups 1, 3, 4, 5, and 6, and on occasion 2.
†Required of students in Vocational Groups 1, 2, 3.

## THIRD (SENIOR) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| C.P. 23. VI The Care of the Parish | 3 |
| Pr. 31. VIII Preaching (Practice) | 1 |

# *Schedule of Required Courses*

## FIRST YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | N. T. 18 | I P. S. 10 | N. T. 18 | N. T. 18 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | C. H. 13 | Assembly | C. H. 13 | C. H. 13 | |
| 12:00 | C. C. 16 | | C. C. 16 | | C. C. 16 | |
| 2:00 | §T. S. 20 | †Practicum | §T. S. 20 | | §T. S. 20 | |
| 3:00 | O. T. 11 | | O. T. 11 | | O. T. 11 | |

## FIRST YEAR—SECOND SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. H. 14 | C. H. 14 | | C. H. 14 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | VII C.W. 40 | Assembly | VII C.W. 40 | VII C.W. 40 | |
| 12:00 | | | | | | |
| 2:00 | H. T. 21 | ‡Practicum | H. T. 21 | | H. T. 21 | |
| 3:00 | II P. C. 26 | | II P. C. 26 | | II P. C. 26 | |

†For Student Pastors, additional sections of Practicum are available.
‡For Duke Endowment Students, additional sections of Practicum are available.
§Students with Advanced Standing may enroll in C. C. 16, *Contemporary Western Culture.*
Professional Courses I and II required of all students.

## SECOND YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. T. 32 | C. T. 32 | | C. T. 32 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | A. C. 28 | Assembly | A. C. 28 | A. C. 28 | |
| 12:00 | | III Preaching 29 | | III Preaching 29 | | |
| 2:00 | N. T. 19 | W. C. 24 | N. T. 19 | W. C. 24 | N. T. 19 | |

## SECOND YEAR—SECOND SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. T. 33 | C. T. 33 | | C. T. 33 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | C. E. 27 | Assembly | C. E. 27 | C. E. 27 | |
| 12:00 | | IV C. Ed. 22 | IV C. Ed. 22 | V Preaching 30 | IV C. Ec. 22 | |
| 2:00 | O. T. 12 | | O. T. 12 | | O. T. 12 | |

## THIRD YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | | | | | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | | Assembly | | | |
| 12:00 | | VI C. P. 23 | VIII Pr. 31 | VI C. P. 23 | VI C. P. 23 | |
| 2:00 | | | | | | |

## VOCATIONAL GROUPS

In recognition of the existing and growing diversity of function within the 20th century Protestant Christian ministry, the program of studies leading to the B.D. degree has been designed to afford variability of emphasis within a basic unity. The core curriculum of basic theological studies provides uniform requirements for all. Variability of emphasis derives from the carefully tailored requirements peculiar to each vocational group. Election of a vocational group is election of a cluster of required courses regarded as providing adequate conversancy with a range of subject matter most pertinent to the special emphasis of the vocational group.

Each student shall choose his vocational group during the second semester of his first or Junior year and give notice of his choice to the office of the Dean of Students not later than May 1.

The student is urged to consult his faculty adviser in making his selection of a vocational group. Students electing Vocational Group I will be certified for that group by the Dean of Students. Students electing Vocational Group II shall have the approval of Professor Kale; those electing Vocational Group III, the approval of Professor Lacy; those electing Vocational Group IV, the approval of Professor Goodling. Students electing Vocational Group V or VI shall have the approval of the Dean and must offer an average of "B minus" or better for the academic record of their junior year. Choice of a vocational group is regularly subject to review of the Dean, and the right to require alteration of election is reserved.

A qualifying final discipline is attached to each vocational group and constitutes a requirement for graduation. Open to students in their senior year, it carries two semester hours credit. See page 34.

Electives in sufficient amount to complete 90 hours for graduation will be taken.

### I. THE PARISH MINISTRY

A student electing Vocational Group I shall plan his program to include one course at a level higher than the core requirement from six of the following areas:

Biblical Studies
Care of the Parish
Christian Education
Historical Studies
Pastoral Care
Church at Worship
Theological Studies

This Vocational Group requires the following Professional Courses: III, IV, V, VI, VII, VIII, and Philosophy of Christian World Mission.

### II. THE MINISTRY OF CHRISTIAN EDUCATION

A student should plan his courses so as to include three of the following Christian Education courses: 125, 126, 161, 162, 169 and at least one course from among the following: 164, 165, 166. In addition the student should take one advanced course in each of the following fields: Christian Theology, Bible, American Christianity, Historical Theology or Church History, Christian Ethics, Pastoral Care, and Worship.

This Vocational Group requires the following Professional Courses: IV, VI, VII, and Philosophy of Christian World Mission.

Those students planning to pursue the Ministry of Christian Education within the Parish Ministry may also in certain circumstances be advised to take Professional Courses III and V.

### III. THE MINISTRY OF MISSIONS

The student should plan his course so as to include the following courses in Missions and related subjects: W.C. 24, 133, and W.C. 156, H.R. 158, C.E. 190. In addition he should take at least one advanced course in Biblical Studies; and one in Theology or Historical Theology; and at least one of the following courses, depending on his field of anticipated service: H.R. 179, H.R. 180, H.R. 182, or T.S. 213 (with appropriate substitutions if these are not offered).

Professional Courses III, IV, V, and VII are required of this group.

### IV. THE MINISTRY OF PASTORAL CARE

In addition to the required course in Pastoral Care, P.C. 26, the student should plan his program so as to include the following: P.C. 170; P.C. 171 or 172; P.C. 177; P.C. 174 or 188; C.T. 125 or T.S. 102; H.T. 121 or one advanced course in Church History. Students must also take one advanced course in *each* of the following areas: Christian Theology; Christian Ethics or Christianity and Culture; Biblical Studies.

Professional Courses III, V, VI*, and VII are required of this group.

### V. THE MINISTRY OF TEACHING

A student electing Vocational Group V shall declare his major during the second semester of his first or junior year and shall select for concentration five of the areas listed below of which one shall be the designated major in which he shall take not less than nine semester hours. He shall in addition, ordinarily, take not less than five semester hours in each of the other four areas. Normally, the above requirements are met by courses of advanced level; however, introductory courses of the Core Curriculum, not already taken as standard requirements of the Junior and Middler years may be included as fulfilling the major and minor areas of study.

| | |
|---|---|
| American Christianity | Historical Theology |
| Christian Education | History of Religions |
| Christian Ethics | New Testament |
| Christianity and Culture | Old Testament |
| Church History | Theology and Philosophy of Religion |

Professional Courses I; II; and III and V, or IV.

### VI. THE MINISTRY TO THE CAMPUS

Students electing this group are required to take at least one advanced course in Christianity and Culture, and one advanced course in Pastoral Care. They are also required to take C.P. 149. In addition, they are advised to select electives in consultation with the director of Vocational Group VI in such fashion to maintain balance between the several disciplines.

Students of this group are required to serve an apprenticeship which may be accomplished in either of two ways:

1. A student may work part-time for one academic year as commuting active staff member of a denominational college chaplaincy program currently operating on one of the campuses within a fifty-mile radius of Duke University. Specific assignments and terms of employment as permitted by the academic load of the student would, in such cases, be arrived at in consultation with the director of Vocational Group VI and the Dean of Students.

2. A student may apply to an appropriate foundation (or other comparable agency) for grant to work full time for a year as a Seminary intern in a college campus situation and, if he is awarded such a grant, fulfill in this way the

* C.Ed. 161 or 162 may be substituted for Professional Course VI.

apprenticeship requirement. Students of Group VI are encouraged to apply for such a grant before proceeding otherwise.

A student's association as intern or member of chaplain's staff will be recorded on his transcript. Regular reports of the student's activity and performance are to be made by the student and by his immediate supervisor during the term of his work as intern or staff member.

Professional courses III, IV, V, and VII are required of this group.

## SENIOR VOCATIONAL QUALIFYING FINALS

Each student must, as a requirement for graduation, complete the qualifying discipline of his chosen Vocational Group as described below:

*For Vocational Group I:* On the basis of Biblical materials designated by instructors and developed according to method and standards described in exemplary lectures given by a faculty panel, a student of this group is to provide the following: (a) a complete, written exegesis of an assigned Biblical text, (b) a written explanation of the theology implicit and explicit in the passage, together with a written statement of his credo regarding the theology discussed, and (c) the manuscript of an expository sermon embodying the exegetical insights and theological position set forth in (a) and (b).

*For Vocational Groups II and III:* A student of either of these groups presents to a specified committee of the faculty an essay on an assigned subject. For credit the essay must, in the opinion of the committee, demonstrate the relation of the student's choice of particular field to his total program of study.

*For Vocational Group IV:* Each student electing this group must complete the seminar in the Theology of Pastoral Care, staffed by an interdisciplinary committee of the faculty, and present to the committee a paper on an assigned subject during the course of the seminar.

*For Vocational Group V:* A student of this group must take a seminar involving coalition between at least two of the disciplines of historical, Biblical, and theological studies. Opportunity and responsibility for conducting class sessions through reports, discussion-direction, and consultation will afford distinctive experience in the teaching situation.

*For Vocational Group VI:* Students of this group are not required to take a qualifying final but must fulfill the demands of an apprenticeship described above.

Students of Groups I and V normally fulfill the above requirements during their fifth or sixth semester of residence. Students of Groups II and III normally receive assignments early in the fifth semester of residence and complete the assignment before graduation, although the date by which assignments must be completed may be set at the

discretion of the student's committee. Students of Group IV normally take their seminar in the sixth semester of residence. The qualifying discipline for each group carries, when successfully completed, two semester hours' credit.

## ADMINISTERING THE CURRICULUM

For the administration of the curriculum the following regulations have been adopted:

Full-time students must take the required courses as specified for the respective semesters.

The schedules of all students are subject to review and approval of the Dean and the Committee on Academic Standing.

*Students entering* (Students who entered the Divinity School prior to September 1963 are governed by *announcements for 1962-63,* Divinity School catalogue, page 37) *the Divinity School in candidacy for the B.D. degree under the catalogue of 1963-64, and who accept student pastorates are advised that their program of study will require a fourth year. Students with pastoral charges will enroll for not less than eight nor more than twelve semester hours in any given semester.*

Ordinarily, a student enrolled in candidacy for the B.D. or M.R.E. shall enroll for no less than eight semester hours in any semester.

Not over 30 semester hours of Summer Session work may be credited toward the degree of Bachelor of Divinity.

The status of "special student" may not be granted simply to permit avoidance of the schedule of required courses. Every request for this classification will be carefully investigated and approval of the Dean is required.

A fee of $15.00 is charged for auditing any course except where a student is already paying regular University fees. Permission to audit requires the approval of the Dean and the instructor concerned.

Student pastors and students working under the Duke Endowment Summer Field Work program of the Rural Church, are required to take one of the Field Work Practicums.

## LANGUAGE STUDY

For a student planning to take both Greek and Hebrew: the Greek may be continued in the second year by postponing N.T. 19 in the fall semester and waiving O.T. 12 in the spring semester.

A student who takes six hours of N.T. language may be excused from either N.T. 18 or N.T. 19; one who takes six hours of O.T. language may be excused from either O.T. 11 or O.T. 12, depending on the year in which he takes Hebrew.

A part-time student who desires to begin the study of Greek in the first year may postpone the required course in Old or New Testament.

Suitable entry will be made on the permanent record of any student who is granted permission to deviate from the requirements in the matter of language.

## GRADUATION CREDITS

It is the responsibility of each student to see that he meets all requirements for graduation, and to take his courses in proper sequence. He is also responsible for seeing that any special permission granted him to deviate from the normal program is properly recorded in his personal files. Deviations from a normal academic program must be approved by the Dean of Students as representative of the Dean of the Divinity School.

## GRADING SYSTEM

The grading system of the Divinity School employs the letters A, B, C, D, and F, which have been defined as follows: A = Excellent; B = Superior; C = Average; D = Inferior; F = Failure; WP = Withdrew Passing; WF = Withdrew Failing; WI = Withdrew Illness and I = Incomplete; P, Passed. (See below.) No percentage equivalents are stated. A student is expected to maintain an average of C.

In all courses where the instructor considers attendance a necessary part of the work of the course, a student may not receive a grade of over C if his absences total 12% of the regular class periods, and if the absences total 24% of the class periods he may not receive credit for the course.

## INCOMPLETES

A student may, with the permission of the instructor concerned, petition the Dean of Students to receive a grade of "incomplete" in a course. Such permission may be granted when a student, through some circumstance beyond his control, such as illness, has been hindered from meeting the course requirements. No "incomplete" is recorded without permission in writing from the Dean of Students. Ordinarily, an "incomplete" will not be approved in the case of students completing their academic work in the fall semester. An "Incomplete" automatically becomes an "F" unless it is removed through completion of assigned work by the following dates:

For "Incompletes" incurred in fall semester courses, March 15, following

For "Incompletes" incurred in spring semester courses, October 15, following

For "Incompletes" incurred in summer courses, October 15, following.

Ordinarily, a fee of $10.00 shall be charged in the case of each "incomplete" allowed to a student.

## CHANGE OF COURSE OR WITHDRAWAL

A student is permitted to change his registration for course work without incurring a penalty no later than completion of the second meeting of the course from which he desires to withdraw or, correspondingly, of the course to which he seeks admission. All such changes shall be approved by a member of the Registration Committee.

No student shall be permitted to drop a course after the expiration of one-third of the period of instruction of the course without incurring failure, except for causes adjudged by the Dean or Dean of Students to be beyond the student's control. Conditions of emergency and not considerations of convenience shall be regarded as determinative in considering requests.

## GRADUATION WITH DISTINCTION

Students who achieve a grade point average of 3.75 (A, 4; B, 3; C, 2; D, 1) for over-all academic record in the Divinity School are granted the degree of Bachelor of Divinity, *summa cum laude*. Students with a grade point average of 3.5 are awarded the degree, *magna cum laude*. Such distinction is specified on their diplomas.

# Requirements for the Degree of Master of Religious Education

THE course of study leading to this degree is designed for persons desiring to engage in various forms of Christian Education.

Candidates for this degree must hold the degree of A.B. (or its equivalent), based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and with academic and personal records which afford promise of competence in this area of service. The course of study will be especially useful for individuals who have had one or more years of experience in Christian Education and desire further training. Candidates for this degree will be limited in number, and individuals interested are urged to apply for admission well in advance of the opening of the academic year. All work offered for this degree, whether in the regular year or in summer sessions, must be completed within a period of six years from the date of beginning.

It is desirable that each applicant for admission show a "B" average in his college work. An applicant must show a college average of not less than "B—."

## PREREQUISITES

Three of the following five prerequisite studies must have been taken by the candidate prior to his admission to the Divinity School or must be secured, without credit toward the M.R.E. degree, after being admitted:

| | |
|---|---|
| General Psychology | 3 s.h. |
| Sociology | 3 s.h. |
| Education | 3 s.h. |
| Philosophy | 3 s.h. |
| Religion | 3 s.h. |

## GENERAL REQUIREMENTS

Sixty semester hours of graduate-professional work are required for graduation. Not more than twelve semester hours of this work may be taken in approved summer sessions.

No credits are allowed for undergraduate courses. However, in approving plans of study leading to this degree, consideration will be given to earlier work taken in the fields of Biblical studies and Christian Education provided such courses were taken in the Junior and Senior years in accredited four-year colleges. Also, where candi-

dates for the degree have been engaged professionally as Directors of Christian Education for not less than twelve months prior to entering the Divinity School the amount of Field Work may, upon recommendation of the Director of the M.R.E. program and the approval of the Dean, be reduced to not less than three hours of Project or Directed Field Work during the period required for completing requirements for the degree.

A student who secures credit for 15 semester hours each semester will be in line for graduation at the end of two academic years. The amount of work allowed in each semester may not exceed that permitted in the B.D. curriculum.

Candidates must also pass the English Bible examinations or equivalent described under requirements for the B.D. degree. Normally these examinations are taken in the second year of the M.R.E. program, but, with permission of the Director of the M.R.E. program, may be taken during the student's first year of residence.

## COURSE REQUIREMENTS FOR THE M.R.E. DEGREE

| *Subject* | *Required Semester Hours* |
|---|---|
| Biblical Studies (O.T. and N.T.) | 9 to 12 |
| Church History, Historical Theology and American Christianity | 9 in two or more of these fields |
| Christian Theology | 3 to 6 |
| Philosophy of Religion or Christian Ethics | 3 |
| Worship | 3 |
| Pastoral Care | 3 |
| Christian Education (including missionary education) | 11 |
| Christian Education Practicum | 3 |
| Required Hours | 44 to 50 |
| Electives | 10 to 16 |
| TOTAL | 60 |

# Requirements for the Degree of Master of Theology

THE course of study leading to the degree of Master of Theology is designed for graduates of accredited theological schools who desire to continue or resume their theological education for enhancement of professional competence in selected areas of study. Enrollment in the Th.M. program is open to a limited number of students who have received the B.D. (or the equivalent) with superior academic records.

## GENERAL REQUIREMENTS

The general requirements for the degree of Master of Theology are:

(1) thirty semester hours of advanced studies, with a minimum grade of "B" in each course;

(2) superior performance in a comprehensive examination covering the major and minor areas of study;

(3) residence for one academic year.

There are no general language requirements, but classical or modern languages may be required for certain courses (for example, Hebrew or Greek in Biblical studies.)

## THE PROGRAM OF STUDY

At least twelve of the required thirty hours must be taken in one of the basic divisions of study (Biblical, Historical, Theological, or Professional) which shall be designated as the candidate's major; and at least six hours in another of the divisions which shall be designated as the candidate's minor. No more than twelve hours may be taken in summer sessions. No more than six semester hours of work completed in another accredited institution may be transferred and credited toward the degree. Ordinarily, no more than six hours may be taken through directed reading, and no more than three in any one semester or summer term. In the area of Pastoral Care, up to fourteen hours may be taken through clinical training.

The major in Pastoral Care requires a calendar year. The candidate normally begins his training June 15 with 12 weeks of full-time clinical training.

Each student will plan his program of courses and directed reading

or clinical training with the guidance of a committee of two to be appointed by the Director of the Master's Program. The committee will include a professor in the student's major area of interest, who will act as chairman, and a professor in the minor area. The chairman, in consultation with the Director and the other member of the committee, will prepare, administer, and evaluate the comprehensive examination.

The comprehensive examination will be given at the close of the course of study for the degree, ordinarily in May or September.

The entire program of studies and comprehensive examination should be completed within twelve months. In exceptional cases, the time limit may be extended, but in no case beyond three years.

# Courses of Instruction*

REQUIRED courses are numbered from 10 to 70. Elective courses carrying credit in the Divinity School only are numbered from 71 to 199. Courses approved for credit in both the Divinity School and the Graduate School of Arts and Sciences are numbered above 200. Lists of courses to be offered in any semester will be available at the time of each registration.

## *I. Biblical Studies*

### OLD TESTAMENT

OLD TESTAMENT ENGLISH BIBLE I. (Meets two hours weekly.) 1 s.h. MR. EFIRD

11. INTRODUCTION TO THE OLD TESTAMENT I.—The origin, literary forms, and contents of the books of the Old Testament in their geographical and historical setting on the Exile. 3 s.h. MR. STINESPRING

12. INTRODUCTION TO THE OLD TESTAMENT II.—Introduction to and interpretation of Exilic and post-Exilic prophecy, Psalms, wisdom literature, the Chronicler, apocalyptic, and the Apocrypha. 3 s.h. MR. STRUGNELL

101. POST-EXILIC PROPHECY.—A study of the post-Exilic prophets from Ezekiel to Daniel, with special reference to Messianic prophecy and related theological problems. 2 s.h. MR. STRUGNELL

106. EXEGESIS OF THE ENGLISH OLD TESTAMENT.—A. A book of the Pentateuch; B. A prophetical book; C. A historical book; D. Selected poetical materials. (O.T. 106 A, O.T. 106 B, O.T. 106 C, and O.T. 106 D are separate courses, offered in different semesters.) Prerequisite: O.T. 11 or the equivalent. 2 s.h. STAFF

196. THE BIBLE AND RECENT DISCOVERIES.—A survey of the contribution of the cultural setting of the Bible as an aid to its understanding. 3 s.h. MR. STRUGNELL

201-202. FIRST HEBREW.—The principles and structure of the Hebrew language with translation of selected Old Testament narratives. One year of Greek prerequisite. 6 s.h. MR. STINESPRING

207. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament prose (Pentateuch and historical books in alternate years). First semester. 3 s.h. STAFF

208. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament poetry (Prophets and the Writings in alternate years). Second semester. 3 s.h. STAFF

209. BIBLICAL THEOLOGY.—A study of the Old and New Testaments in regard to their theological relationship. Prerequisite: O.T. 11 and N.T. 19. 3 s.h. MR. ANDERSON

301. THE THEOLOGY OF THE DEAD SEA SCROLLS.—A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. Prerequisite: O.T. 11. 3 s.h. MR. STRUGNELL

* On approval of the Dean, courses offered in the Graduate School of Arts and Sciences other than those approved for credit in the Divinity School may be approved for credit in individual cases, provided no equivalent course is offered in the Divinity School; each case to be decided on its merits.

302. STUDIES IN THE INTERTESTAMENTAL LITERATURE.—Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 s.h. MR. ANDERSON

304. ARAMAIC.—A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 s.h. MR. STINESPRING OR MR. STRUGNELL

305. THIRD HEBREW.—An interpretative study of late Hebrew prose, with reading from Chronicles, Ecclesiastes, and the Mishnah. 3 s.h. MR. STINESPRING

306. LANGUAGE AND LITERATURE OF THE DEAD SEA SCROLLS.—A study in interpretation. Prerequisite, a knowledge of Hebrew. 3 s.h. MR. STRUGNELL

307. SYRIAC.—A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 s.h. MR. STINESPRING

309. HISTORY OF THE ANCIENT NEAR EAST.—A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 s.h. MR. STINESPRING

310. OLD TESTAMENT PROPHECY.—The prophetic movement in Israel with special emphasis on the theological standpoint of the prophets of the eighth century B.C. Prerequisites: O.T. 11 and O.T. 12. 3 s.h. MR. STINESPRING

*HISTORY OF ART 215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—The development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part Syria and Palestine to the Persian conquest. 3 s.h. MR. MARKMAN

*HISTORY OF ART 216. RELIGIOUS ART OF THE CLASSICAL WORLD.—The religious art, particularly architecture and sculpture, of Greece and Rome with special emphasis on the monuments in the Near East. 3 s.h. MR. MARKMAN

## NEW TESTAMENT

NEW TESTAMENT ENGLISH BIBLE II. (Meets two hours weekly.) 1 s.h. MR. EFIRD

18. EARLY CHRISTIAN LIFE AND LITERATURE.—A basic study of the civilization in which Christianity began; the origin and development of the Christian Church and its literature through the second century. 3 s.h. MR. EFIRD

19. INTRODUCTION TO NEW TESTAMENT THEOLOGY.—A constructive analysis and exposition of the positive doctrinal content of the New Testament. Prerequisite: N.T. 18. 3 s.h. MR. ANDERSON

103-104. HELLENISTIC GREEK.—Designed for beginners to enable them to read the Greek New Testament. 6 s.h. (Two sections) STAFF

105. STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 2 s.h. MR. ANDERSON OR OTHERS

116. EXEGESIS OF THE ENGLISH NEW TESTAMENT I.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles. (N.T. 116 A, N.T. 116 B, and N.T. 116 C are separate courses, offered in different semesters.) 2 s.h. MR. ANDERSON OR OTHERS

117. EXEGESIS OF THE ENGLISH NEW TESTAMENT II.—A. The Gospel and Epistles of John; B. Romans. (N.T. 117 A and N.T. 117 B are separate courses, offered in different semesters.) 2 s.h. MR. PRICE OR OTHERS

217. THE NEW TESTAMENT IN GREEK.—Extensive reading of the Greek text of the New Testament, with special emphasis upon its interpretation. Prerequisite: six semester hours' study of the Greek language. 3 s.h. STAFF

* Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

225. LIVING ISSUES IN NEW TESTAMENT THEOLOGY.—Examination of recent major questions of debate in the New Testament field. Prerequisite: N.T. 19. 3 s.h. MR. ANDERSON

226. EXEGESIS OF THE GREEK NEW TESTAMENT I.—A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. MR. PRICE

227. EXEGESIS OF THE GREEK NEW TESTAMENT II.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. MR. ANDERSON

318. TEXTUAL CRITICISM OF THE NEW TESTAMENT.—A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. Prerequisite: N.T. 103-104, or the equivalent. 3 s.h. MR. CLARK

340-341. SEMINAR IN THE NEW TESTAMENT.—Research and discussion on a selected problem in the Biblical field. 2 s.h. MR. ANDERSON AND/OR MR. PRICE

SEE ALSO Pr. 185 and O.T. 209.

*GREEK 257.—The social and cultural history of the Hellenistic world from Alexander to Augustus. 3 s.h. MR. ROGERS

*LATIN 258.—The social and cultural history of the Graeco-Roman world. 3 s.h. MR. ROGERS

# *II. Historical Studies*

## CHURCH HISTORY

13. HISTORY OF THE CHURCH TO THE PROTESTANT REFORMATION.—A survey through the fifteenth century in terms of spiritual genius, organizational development, great literature, and representative movements. 3 s.h. MR. PETRY

14. HISTORY OF MODERN EUROPEAN CHRISTIANITY.—A survey of the main currents in Reformation and post-Reformation church history. 3 s.h. MR. HILLERBRAND

85. SEMINAR IN MODERN EUROPEAN CHRISTIANITY.—A seminar devoted to the study of select aspects of Reformation and Post-Reformation Church History. This year the seminar will consider Reformation and Post-Reformation Confessions of faith. Prerequisite: C.H. 13-14. 2 s.h. MR. HILLERBRAND

137. RELIGIOUS LEADERS IN CHRISTIAN HISTORY.—Representative leaders in the early and medieval church studies in relation to contemporary churchmanship. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

138. GREAT BOOKS IN CHRISTIAN HISTORY.—An intensive study of Augustine's *Confessions,* Thomas à Kempis' *Imitation of Christ,* Erasmus's *Complaint of Peace,* Luther's *Christian Liberty,* Calvin's *Instruction in Faith,* and Andrewes' *Private Devotions.* 3 s.h. MR. PETRY

139. METHODISM.—A study of Methodist societies in England and the developing church in America as they gave rise to such historic issues as polity, education, division, and reunion. Prerequisite: C.H. 13. 2 s.h. MR. PETRY

140. THE RISE OF METHODISM AND THE ANGLICAN BACKGROUND.—The Methodist societies within the Church of England to the death of Wesley. Prerequisite: C.H. 13-14. 3 s.h. MR. BAKER

(Students are advised that either C.H. 139 or C.H. 140 will satisfy the Methodist Discipline Requirement No. 344.)

* Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

142. BRITISH METHODISM AFTER WESLEY.—British Methodism in its nineteenth and twentieth century development. Prerequisite: C.H. 14. 3 s.h. MR. BAKER

250. THE REFORMATION AND COUNTER REFORMATION.—History and thought of European Christianity between 1517-1680. 3 s.h. MR. HILLERBRAND

251. PIETISM, DEISM, AND RATIONALISM.—History and thought of European Christianity between 1650 and 1750. 3 s.h. MR. HILLERBRAND

330. THE CHURCH IN EUROPE SINCE 1800.—Emphasis is placed on the relation of the church to the social, economic, and political life of Modern Europe. Particular attention is given to Papal pronouncements on social issues, the relationship of Eastern to Western Institutions, and ecclesiastical historiography as it involves source editions, periodicals, and ecumenical literature. 3 s.h. MR. PETRY

331. THE SOCIAL MESSAGE OF THE EARLY AND MEDIEVAL CHURCH.—A study of the social teachings and contribution of the Christian church prior to the Protestant Reformation. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

332. THE MEDIEVAL CHURCH.—Outstanding characteristics of the medieval church, emphasizing theory, polity, institutions, sacraments, and worship. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

334. CHURCH REFORMERS AND CHRISTIAN UNITY.—The work of such reformers as Marsilius of Padua, William of Ockham, Jean Gerson, Pierre d'Ailly and Nicholas of Cusa in relation to ecclesiastical schism and the search for Christian unity through representative councils. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

336. CHRISTIAN MYSTICISM IN THE MIDDLE AGES.—Source studies, in historical perspective, of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

339. LEFT WING MOVEMENTS OF THE REFORMATION.—A survey of the history and theology of the "radical" Reformation. 2 s.h. MR. HILLERBRAND

## HISTORICAL THEOLOGY

21. THE THEOLOGY OF THE PROTESTANT REFORMATION.—The Reformation of the 16th century and its outcome in the 17th and 18th centuries. 3 s.h. MR. GRISLIS

111. LITERATURE OF THE LATIN CHURCH.—Readings, in the Latin originals, of diverse kinds of writing produced by the Latin Church in various periods of its history. Prerequisite: Permission of instructor. 3 s.h. MR. STRUGNELL

120. FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles' the Nicene and the Chalcedonian Creeds in their contemporary setting. 3 s.h. MR. GRISLIS

121. SACRAMENTS IN THE CHRISTIAN CHURCH.—Ecumenical studies in devotion and division: Baptism and the Lord's Supper. 3 s.h. MR. GRISLIS

123. THE THEOLOGY OF THE EARLY CHURCH.—An introduction to the history of doctrine from the 2nd to the 6th centuries. 3 s.h. MR. GRISLIS

129. CRITICS OF CHRISTIANITY.—A Survey of Anti-Christian Polemics from Celsus to Nietzsche. 2 s.h. MR. HILLERBRAND

234. THE THEOLOGY OF THOMAS AQUINAS.—A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 s.h. MR. GRISLIS

240. THE THEOLOGY OF RICHARD HOOKER.—An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 s.h. MR. GRISLIS

260. SEMINAR: LIFE AND THOUGHT OF THE WESLEYS.—A seminar on John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Permission of instructor. 3 s.h. MR. BAKER

261. THE THEOLOGY OF JOHN WESLEY.—A study of the development and structure of Wesley's theology, with special reference to his doctrines of man and salvation. Prerequisite: Permission of instructor. 2 s.h. MR. RICHEY

337. THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 2 s.h. MR. HILLEBRAND

338. THE THEOLOGY OF JOHN CALVIN.—An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. Prerequisite: H.T. 21. 3 s.h. MR. GRISLIS

## AMERICAN CHRISTIANITY

28. HISTORY OF AMERICAN CHRISTIANITY.—A consideration of the nature of Christianity in America and the history of its development. 3 s.h. MR. HENRY

199. THE AMERICAN SOCIAL GOSPEL.—A study of Protestant social thought and action in America since 1865. 3 s.h.

296. RELIGION ON THE AMERICAN FRONTIER.—A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. Prerequisite: A.C. 28. 3 s.h. MR. HENRY

372. THEOLOGY OF PAUL TILLICH.—An examination of Tillich's philosophical theology. 2 s.h. MR. ROBINSON

385. RELIGION IN AMERICAN LITERATURE.—A critical study of the meaning and value of religious motifs reflected in American literature. 3 s.h. MR. HENRY

395. CHRISTIAN THOUGHT IN COLONIAL AMERICA.—Exposition of the main currents in Protestant Theology. 3 s.h. MR. HENRY

396. LIBERAL TRADITIONS IN AMERICAN THEOLOGY.—A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 s.h. MR. HENRY

397. CONTEMPORARY AMERICAN THEOLOGY.—A critical appraisal of major tendencies. 3 s.h. MR. HENRY

## WORLD CHRISTIANITY

24. PHILOSOPHY OF THE CHRISTIAN WORLD MISSION.—A study of theological foundations, guiding principles, and contemporary problems of the World Christian Community. 2 s.h. MR. LACY

133. HISTORY OF CHRISTIAN MISSIONS.—A survey of the spread of Christianity with special emphasis on 19th and 20th century Protestantism. 2 s.h. MR. LACY

135. AREA STUDIES OF THE CHRISTIAN CHURCH.—The cultural setting and current programs and policies of the Church in one of the following areas: a. Latin America, b. India and Pakistan, c. Africa, d. Southeast Asia, e. Japan-Korea-Philippines, f. Moslem Lands, or g. United States Home Missions. (The area of study to be determined by student interest in consultation with the instructor.) 2 s.h. MR. LACY AND OTHERS

156. THE ECUMENICAL MOVEMENT.—Its contemporary development, structures, activities—and problems, against the background of Church unity and disunity. 3 s.h. MR. LACY

386. SEMINAR: THEOLOGICAL TRENDS IN THE WORLD CHURCH.—Contemporary currents of Christian thought as they affect the resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 s.h. MR. LACY

SEE ALSO: C.Ed. 126, C.E. 190. C.E. 292, and C.E. 333.

## HISTORY OF RELIGIONS

158. CONTEMPORARY NON-CHRISTIAN RELIGIONS.—Critical consideration of contemporary conditions in major non-Christian traditions, with special reference to Hinduism, Buddhism, Islam, and African Religions. 3 s.h.
MR. SULLIVAN

179. RELIGIONS OF THE FAR EAST.—Historical and theological introduction to the major indigenous traditions of China and Japan. 3 s.h. MR. SULLIVAN

180. RELIGIONS OF THE NEAR EAST.—Historical and theological introduction to the major indigenous traditions of the Near East, especially Zoroastrianism, and Islam. 3 s.h. MR. PARTIN

182. RELIGIONS OF INDIA.—Historical and theological introduction to Indian religious life and thought. The development of Buddhism is covered, as well as Jainism and Sikhism, along with the various modes of Hinduism. 3 s.h.
MR. SULLIVAN

280. THE HISTORY OF RELIGIONS.—A study of the methodology of the History of Religions, the nature of religious experience and specific categories of religious phenomena. Permission of instructor. 3 s.h. MR. SULLIVAN

# *III. Theological Studies*

## PHILOSOPHY OF RELIGION

20. TYPES OF RELIGIOUS PHILOSOPHY.—Basic historical orientation in religious thought, especially in Western Culture. 3 s.h. MR. LANGFORD

102. CHRISTIAN APOLOGETICS AND MODERN WORLD VIEWS.—A constructive approach to the Hebrew-Christian understanding of Creator and creature in the light of contemporary scientific knowledge. 3 s.h. MR. ROBINSON

## CHRISTIAN THEOLOGY

32. CHRISTIAN THEOLOGY I.—A constructive statement of the themes of systematic theology as a task of the church today: theological method, knowledge of God, man, and Christ. 3 s.h. MR. CUSHMAN AND MR. HALL

33. CHRISTIAN THEOLOGY II.—God the redeemer, the church, word and sacraments, authority and ministry, the Kingdom of God. 3 s.h. MR. HERZOG

108. REVELATION AND AUTHORITY.—A study of the relationship between revelation, Bible, preaching and the church. 3 s.h. MR. HERZOG

110. THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 3 s.h. MR. ROBINSON

*125. THEOLOGICAL AND PSYCHOLOGICAL INTERPRETATIONS OF MAN.—An inquiry into the relations of theological and psychological views of man's nature, predicament, and deliverance. 3 s.h. MR. RICHEY

195. ORIGINS OF DOGMATIC THOUGHT.—An analysis of dogmatic concepts in the Gospel of John: their development into a body of doctrine. 3 s.h.
MR. HERZOG

200. THE PERSON AND WORK OF CHRIST.—The problem of knowledge of Christ and formulation of a doctrine of his work and person in the light of Biblical eschatology. Prerequisite: C.T. 32-33. 2 s.h. MR. CUSHMAN OR MR. HALL

213. THE STRUCTURE OF ROMAN CATHOLIC THOUGHT.—The main characteristics of Roman Catholic theology with consideration of possibilities and limitations in ecumenical conversation with Rome. Prerequisites: C.H. 13 and 14 and H.T. 21. 3 s.h. MR. HERZOG

216. KIERKEGAARD STUDIES.—Critical examination of selected works. Prerequisite: C.T. 32 or permission of the instructor. 3 s.h. MR. ROBINSON

* May be taken and grade recorded as Christian Educ. 125.

224. CONCEPTIONS OF MAN IN WESTERN THOUGHT.—An analysis and interpretation of important types of philosophical and theological theory. 3 s.h. MR. RICHEY

303. DOGMA AND THE PROBLEM OF HISTORY.—The authority of Kerygma and the Word of God in twentieth-century European theology. 3 s.h. MR. HERZOG

320. SEMINAR: FRIEDRICH SCHLEIERMACHER.—Critical examination of the dogmatic system. Prerequisite: C.T. 322. 3 s.h. MR. HERZOG

321. PLATONISM AND CHRISTIANITY.—An analysis of Plato's religious philosophy and a survey of its continuing influence in Hellenistic and Christian thought. Prerequisite: six semester hours in theology. 3 s.h. MR. CUSHMAN

322. NINETEENTH CENTURY EUROPEAN THEOLOGY.—Protestant theology from Kant to Herrmann. 3 s.h. MR. HERZOG

323. SEMINAR: BULTMANN.—Critical examination of representative works, with some consideration of relation to the work of Martin Heidegger. Prerequisite: C.T. 32-33 or permission of the instructor. 3 s.h. MR. ROBINSON

325. PHILOSOPHICAL THEOLOGY I.—Main problems in the history of philosophical theology from the pre-Socratics to Descartes. Prerequisite: C.T. 32-33. 3 s.h. MR. CUSHMAN OR MR. ROBINSON

326. PHILOSOPHICAL THEOLOGY II.—Main problems of philosophical theology in the modern period. Prerequisite: C.T. 325. 3 s.h. MR. CUSHMAN OR MR. ROBINSON

328. SEMINAR IN TWENTIETH CENTURY EUROPEAN THEOLOGY.—Critical examination of the thought of selected representative theologians. Prerequisite: permission of instructor. 3 s.h. MR. HERZOG

## CHRISTIANITY AND CULTURE

16. CONTEMPORARY WESTERN CULTURE.—An analysis of the conceptual commitments in contemporary styles of thought and life as reflected in the natural sciences, philosophy, social analysis, and the arts. 3 s.h. MR. POTEAT

80. THE CHRISTIAN FAITH AND TRAGEDY.—An exploration of the tragic view of life as exhibited in selected classic and contemporary works of literature and a comparison of this with Christian belief. 3 s.h. MR. POTEAT

81. RECENT AND CONTEMPORARY ART AND THEOLOGY.—The study of 19th and 20th century painting and sculpture as documents of contemporary man's apprehension of himself and his world; and as elements in the conversation between Christian faith and culture. 3 s.h. MR. POTEAT

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

231. SEMINAR IN CHRISTIANITY AND CONTEMPORARY THOUGHT.—Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relavance for theological inquiry. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

380. EXISTENTIALIST THOUGHT.—An analysis of writings of representative thinkers from Kierkegaard to Sartre. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

## CHRISTIAN ETHICS

27. CHRISTIAN ETHICS I.—The central assumptions and principles of the Christian conception of the good life. 3 s.h. MR. BEACH

114. CHRISTIAN SOCIAL ETHICS.—The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. Prerequisite: C.E. 27. 3 s.h. MR. SMITH

115. MORAL THEOLOGY IN THE TWENTIETH CENTURY.—Critical and comparative examination of ethical theory as exhibited in the work of William Temple and selected contemporary theologians. 3 s.h. MR. SMITH

190. THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 3 s.h. MR. LACY

194. THE PROTESTANT CHURCH AND AMERICAN CULTURE.—Analysis from the perspective of Christian ethics of current problems in the interpenetration of Church and culture with explicit reference to the parish setting. 3 s.h. MR. SMITH

292. CHRISTIANITY AND INTERNATIONAL RELATIONS.—An application of Christian Ethics to world problems. 3 s.h. MR. LACY

333. SEMINAR: MARXIST IDEOLOGY AND CHRISTIAN FAITH.—Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. Prerequisite: C. E. 190 or equivalent. 3 s.h. MR. LACY

389. CHRISTIAN ETHICS AND CONTEMPORARY CULTURE.—A study of the interaction between Christian thought and current secular social theory. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

390. CURRENT PROBLEMS IN CHRISTIAN ETHICAL THEORY.—A critical study, seminar style, of dominant issues in Christian Ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community and vocation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

391. HISTORICAL TYPES OF CHRISTIAN ETHICS I.—A critical study of representative statements of Christian ethical theory, through the early Reformation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

392. HISTORICAL TYPES OF CHRISTIAN ETHICS II.—A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 s.h. MR. BEACH

393. THE CHRISTIAN INTERPRETATION OF HISTORY.—A comparative examination of the chief secular and Christian theories of history current in Western thought. For advanced students. Prerequisite: C.E. 27. 3 s.h. MR. BEACH

394. CHRISTIANITY AND THE STATE.—The relation of the Christian theory of the State to political problems with special consideration of the religious assumptions underlying democratic theory and practice, and of the relationship of Church to State. Prerequisite: C.E. 27. 3 s.h. MR. BEACH

# *IV. Professional Studies*

## THE CARE OF THE PARISH

10. THE CHURCH AND THE MINISTER'S VOCATION.—An orientation course for beginning students, devoted to a consideration of the nature of the Church and the tasks of the ministry. 1 s.h. MR. SMITH AND OTHERS

23. THE CARE OF THE PARISH.—A consideration of the pastor's function as leader of the Christian community. 3 s.h. MR. INGRAM AND OTHERS

146. CHURCH BUILDING.—The role of the pastor in planning and executing building programs in the local church: architectural considerations and counsel, building requirements and plans. 2 s.h. MR. NESBITT

148. CHRISTIAN STEWARDSHIP AND CHURCH FINANCE.—A seminar to consider the principles of stewardship education, budget making, enlistment in church support. 2 s.h. MR. INGRAM AND MR. KALE

149. THE MINISTRY TO THE CAMPUS.—An examination of the circumstances which have produced, and the unique problems which confront, the ministry on the campus, considered from the perspective of the Christian idea of higher education. 3 s.h. STAFF

150. RURAL CHURCH AND COMMUNITY.—The church serving the rural community, factors affecting church and community life, qualifications and task of rural leadership, and the church as a community institution. 2 s.h. MR. NESBITT

151. TOWN AND COUNTRY MINISTRY.—The small church, the circuit church, circuit administration, larger parish and group ministry, and the Town and Country movement. 2 s.h. MR. NESBITT

152. EVANGELISM AND THE LOCAL CHURCH.—A study of the nature, purposes and methods of contemporary Christian evangelism with special attention to the local church. 2 s.h. MR. KALE AND MR. INGRAM

153. PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 2 s.h. MR. INGRAM

154. THE URBAN CHURCH.—The function, nature, program, and administration of the effective city church and of the urban minister's distinctive task. 2 s.h. MR. INGRAM

155a. THE POLITY OF THE METHODIST CHURCH.—The history and present structure of the organization of The Methodist Church. 2 s.h. MR. INGRAM

155b. THE POLITY OF THE BAPTIST CHURCHES.

155c. THE POLITY OF THE CONGREGATIONAL-CHRISTIAN CHURCHES.

155d. THE POLITY OF THE PRESBYTERIAN CHURCHES. STAFF

FIELD WORK PRACTICUM I.—Discussion of various aspects of parish work with opportunity for students to seek guidance respecting procedures and problems. Designed especially for students with parish responsibilities. (Fall Semester. Sections arranged.) 1 s.h. MR. KALE AND OTHERS

FIELD WORK PRACTICUM II.—Required of students expecting summer assignments under the Endowment and Field Work Program. Types of parish service to be discussed. (Spring Semester) 1 s.h. MR. NESBITT AND OTHERS

## CHRISTIAN EDUCATION

22. THEOLOGY AND CHRISTIAN NURTURE.—The implications of theology and educational philosophy for the theory and practice of Christian education. 3 s.h. MR. RICHEY

25. THE CHURCH AND CHRISTIAN NURTURE.—A constructive survey of the local church as a community of Christian nurture: Statement and evaluation of objectives, leadership and resource materials, structural patterns and administrative and supervisory procedures for the church school. 2 s.h. MR. KALE

125. THEOLOGICAL AND PSYCHOLOGICAL INTERPRETATIONS OF MAN.— (See C.T. 125)

126. MISSIONARY EDUCATION IN THE LOCAL CHURCH.—Practical programs for church school, audio-visual aids, preaching, stewardship, and special projects. 2 s.h. MR. LACY AND OTHERS

129. RELIGION AND PERSONALITY.—Investigation of religious aspects of the origins, structure, and development of selfhood. 3 s.h. MR. RICHEY

161. TEACHING METHODS.—Basic teaching procedures required by professional and lay workers in the local church. Opportunities are arranged for observation and guided practice in church schools, and/or other institutions. Required for candidates for the M.R.E. degree. 3 s.h. MR. KALE

162. CURRICULUM BUILDING IN THE LOCAL CHURCH.—An examination of influential theories of and contemporary trends in curriculum construction, together with an evaluation of existing curricula. Actual designing of short units for use in the local church. 3 s.h. MR. KALE

164. CHRISTIAN EDUCATION OF CHILDREN.—The organization and administration of the work of the church with children of the nursery, kindergarten, primary and junior age groups. 2 s.h. MR. KALE

165. CHRISTIAN EDUCATION OF YOUTH.—The organization and administration of the youth program in the local church. 2 s.h. MR. KALE

166. CHRISTIAN EDUCATION OF ADULTS.—A study of the needs of adults; the materials, methods, and principles of organization for the Christian education of adults. 2 s.h. MR. KALE

167. THEOLOGY AND THE LAITY.—A study of contemporary lay movements and centers, the ministry and mission of the laity in Church and world, and the ministry of teaching in the lay renewal of the Church. (For Middlers and Seniors.) 3 s.h. MR. RICHEY

169. THEORIES OF CHRISTIAN EDUCATION.—A critical investigation of current theories of Christian education. 2 s.h. MR. RICHEY

CHRISTIAN EDUCATION PRACTICUM.—Required of M.R.E. candidates. One class per week and supervised project. 3 s.h. MR. KALE AND OTHERS

## PASTORAL CARE

26. INTRODUCTION TO PASTORAL CARE.—The psychology of personal adjustment and pastoral care. An approach to pastoral care and its place in the pastor's total ministry grounded in an understanding of the dynamics of personal adjustment. 3 s.h. MR. GOODLING AND MR. SMITH

170. INTRODUCTION TO PASTORAL COUNSELING.—The philosophy and techniques of formal counseling through discussions of textual and interview material. Prerequisite: P.C. 26. 3 s.h. MR. GOODLING

171. PASTORAL CARE PRACTICUM I.—Pastoral Calls and Personal Counseling. A study of pastoral calling and personal counseling in the parish ministry. Prerequisites: P.C. 26 and 170. 2 s.h. MR. SMITH

172. PASTORAL CARE PRACTICUM II.—Marriage and the Family. A consideration of pre-marital and marital counseling and the psychodynamics of family life. Prerequisites: P.C. 26 and 170. 2 s.h. MR. GOODLING

173. PASTORAL CARE PRACTICUM III.—The Chaplain in a Rehabilitation Program. The ministry to those in alcoholic and correctional institutions. Prerequisites: P.C. 26 and 170. 2 s.h. STAFF

174. THE CHURCH AND MENTAL HEALTH.—The meaning of the self and the resources of the church in doctrine and worship in self-fulfillment. 2 s.h. MR. SMITH

175. ADVANCED PASTORAL CARE PRACTICUM.—For advanced students who want additional clinical experience in one of the Pastoral Care Practicum areas. Consent of the instructor is required. Students may register for from 1 to 5 s.h. clinic credit. STAFF

176. PASTORAL CARE PRACTICUM IV.—The Psychiatric Setting. Lectures by staff and ward visits at the Dorothea Dix Hospital in Raleigh. The place of the minister in a program dealing with the causes, treatment, and prevention of mental illness. Prerequisites: P.C. 26 and 170. 3 s.h. MR. STEININGER

177. PASTORAL CARE PRACTICUM V.—The Hospital Ministry. Pastoral care and counseling with the ill, the dying, bereaved. Prerequisites: P.C. 26 and 170. 2 s.h. and 1 s.h. clinic. MR. GOODLING

188. SCIENCE, FAITH AND PSYCHOANALYSIS.—An analysis of the fundamental categories of the Christian message and psychoanalysis. An exploration into the objectives and the methods of science and the meaning of religion. 3 s.h. MR. SMITH AND OTHERS

271. CLINICAL PASTORAL TRAINING I.—Out-Patient Counseling under psychiatric supervision. 4 s.h. STAFF

273. CLINICAL PASTORAL TRAINING II.—The Chaplain in a Rehabilitation program. Twenty hours of supervised clinical training weekly in a rehabilitation institution. 4 s.h. STAFF

276. CLINICAL PASTORAL TRAINING III.—The Chaplain in a Psychiatric Setting: the mental hospital.

276A. Full-time 12-week summer quarter. 6 s.h.

276B. Twenty hours per week fall semester. 4 s.h.

276C. Twenty hours per week spring semester. 4 s.h. STAFF

277. CLINICAL PASTORAL TRAINING IV.—The Chaplain in the General Hospital setting.

277A. Full-time 12-week summer quarter. 6 s.h.

277B. Twenty hours per week fall semester. 4 s.h.

277C. Twenty hours per week spring semester. 4 s.h. STAFF

## THE CHURCH AT WORSHIP

34. WORKSHOP IN COMMUNICATION.—Intensive drill in voice, diction, speaking and reading. Enrollment by recommendation of teaching faculty. 1 s.h. MR. RUDIN

## PREACHING

29-30. SERMON CONSTRUCTION—THEORY AND PRACTICE.—An investigation of the theory of preaching (first semester). Detailed work in practice preaching and a clinical session each week on the application of theory (second semester). 3 s.h. MR. HALL AND OTHERS

31. ADVANCED SERMON PRACTICE.—A weekly session of clinical exercises in expository preaching and sermon evaluation for senior students of Vocational Group I. Prerequisite: Pr. 29-30. 1 s.h. STAFF

181. PRACTICAL PROBLEMS IN PREACHING.—Analysis of selected sermons and discussion of problems facing the preacher in the pulpit. Prerequisite: Pr. 29. 2 s.h. MR. CLELAND AND MR. HALL

183. EXPOSITORY PREACHING—OLD TESTAMENT.—The exegesis and exposition of selected Old Testament passages for homiletical purposes. Prerequisite: Pr. 29. 2 s.h. MR. CLELAND

184. EXPOSITORY PREACHING—THE PAULINE EPISTLES.—A study for homiletical purposes of the religious experience and theology of Saint Paul and its influence on ethical theory and practice. Prerequisite: Pr. 29. 3 s.h. MR. CLELAND

185. EXPOSITORY PREACHING—NON-BIBLICAL.—An evaluation of drama, poetry and fiction for homiletical purposes. Prerequisite: Pr. 29. 3 s.h. MR. CLELAND

187. PRE-REFORMATION PREACHING.—Sermons, handbooks, and other historical sources studied in relation to Biblical preaching and the liturgical church, the problem of popular ministry and the issues of Christian reform. Prerequisite: C.H. 13. 2 s.h. MR. PETRY

193. THEOLOGY AND PREACHING.—An examination of the relation of systematic theology and homiletical presentation in the sermons of major Christian leaders, past and present. 3 s.h. MR. HALL

## WORSHIP AND CHURCH MUSIC

40. THE CHURCH AT WORSHIP.—The structure of worship, the rites of the church, its music, and the conduct of worship in the context of the Christian year. 3 s.h. MESSRS. CLELAND, HANKS AND RUDIN

134. LITURGICAL READING.—Practice in reading the liturgical materials of the pastoral ministry: Scriptures, prayers, and the rites and seasonal services in the Methodist *Book of Worship*. 2 s.h. MR. RUDIN

141. THE CLASSIC AGE OF THE ENGLISH HYMN.—Eighteenth century development of the English hymn with special reference to Watts and the Wesleys, their precursors and successors. 2 s.h. MR. BAKER

178. CORPORATE WORSHIP.—The theory and practice of the common worship of the Church, using various manuals of worship. One hour to be arranged. 2 s.h. MR. RUDIN

180. CHURCH MUSIC.—A two-fold study including: (1) A survey of the great monuments of church music, (2) Musicianship, songleading and basic conducting; with an emphasis upon the use of the hymn tunes and other music in the Methodist hymnal. 3 s.h. MR. HANKS

CHAPEL CHOIR.—Students who successfully complete C.W. 40 or C.W. 180 before graduation may qualify for credit (to the limit of 2 s.h.) of ½ s.h. for each semester of effective participation in the Chapel Choir. Choir membership (granted by audition) affords opportunity for study of the history and background of church music, and practical consideration of it in the context of public worship.

# Student Expenses and Residential Arrangements

IT is proper that a student should select his school on the basis of educational opportunity. At the same time financial consideration will be of legitimate and often pressing concern. Each student will find the Committee on Scholarship and Financial Aid ready to counsel with him concerning the financing of his seminary course.

The Board of Trustees of Duke University determines the costs of attending the Divinity School and these are subject to change without notice.

## FEES AND COSTS

| *Items* | *Per Semester* |
|---|---|
| Tuition Fee | $262.50 |
| General Fee | 56.50 |
| Approximate cost of meals per semester (estimated) | 275.00 |
| Room per semester (double room) for men | 125.00 |
| Total | $719.00 |

The "General Fee" is in lieu of all special charges, and includes the following fees: Matriculation, Medical, Library, Damage, Commencement, and Diploma. Both the Tuition Fee and General Fee are due and payable not later than the day of registration for a particular semester.

Students matriculating in either semester at a date later than that prescribed in the catalogue shall pay to the Treasurer of the University a penalty of $5.00. After the day of registration no refund of the "General Fee" will be made except for involuntary withdrawal to enter the Armed Services.

Divinity School students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of $15.00 per year plus any Federal taxes that may be imposed. This fee is payable in the fall semester.

Students who are reported by the Treasurer's office as delinquent in their accounts will be debarred from credit in courses until cleared by the Treasurer's office. Transcripts will not be issued for delinquent students.

The total cost for a student to attend the Duke Divinity School varies according to individual tastes and requirements; however, ex-

perience indicates that a single student may expect to spend from $1800.00 up with the average approximately $2050.00 and a married couple may expect to spend from $3500.00 up.

## AUDITING OF COURSES

Persons seeking to audit Divinity School courses must, with the consent of the instructor concerned, secure permission of the Dean's office. In accordance with general University practice a fee of $15.00 per course will be required of all auditors who are not enrolled students.

## STUDENT HEALTH

The payment of the general fee entitles the student who is taking at least 7 hours or more to full medical and surgical care, with the exceptions noted below. This service is under the direction of the University Physician with the co-operation of the staff of Duke Hospital. It includes hospitalization, medical and surgical care, drugs, dressings, X-ray studies, and ward nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes, treatment of teeth and of all chronic conditions, such as the removal of diseased tonsils, are not included in this service. The cost of any necessary braces and orthopedic appliances, as well as of special nursing, must be borne by the student.

Since the Student Health Program does not cover students while away from the Duke Campus, it is imperative that student pastors and assistant pastors (winter and/or summer) who are subjected to the hazards of highway travel with great frequency, secure complementary health and accident insurance for the full 12 month period.

Information concerning such a policy may be secured by inquiring at the office of the Dean of Students. Such a complementary policy is recommended for all students.

Married students are required to carry insurance coverage for their dependents, providing for hospital, medical and surgical care.

## LIVING ACCOMMODATIONS

The Men's Graduate Center is available to men enrolled in the Divinity School. The rooms are equipped for two persons and the rental charge for a double room is $500.00 for the academic year or $250.00 for each occupant ($125.00 each semester per occupant).

Epworth Hall on the Woman's College Campus is available to women enrolled in the Divinity School. The rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant ($137.50 per semester for each occupant).

Duke University Apartments, which consist of efficiency, one- and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the current rental charges per month are $70.00 for the efficiency, $80.00 for the one-bedroom, and $90.00 for the two-bedroom. Heat, electricity, except for window fans and air conditioners, hot and cold water, garbage and trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Residence hall rooms and Duke University Apartments may be reserved by new applicants only if they have been accepted officially for admission to the Divinity School. Applications for residence hall rooms are to be made to the Housing Bureau, Duke Station, Durham, North Carolina. A $25.00 room deposit is required of each applicant before a residence hall room reservation is made. The initial room deposit is effective during the student's residence in the University residence halls if attendance is continuous in regular academic years. The deposit will be refunded under the following conditions:

a. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.

b. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.

c. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Rooms are rented for the academic year but for no period of less than one semester without special arrangements. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the Armed Services. Such refunds will be made in accordance with the University's established schedule. Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing. Occupants are expected to abide by these regulations.

## DINING HALLS

Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates $250.00-$300.00 per semester depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple choice menus and, in addition, the Oak Room, where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West Campus Union.

## MOTOR VEHICLES

Each motor vehicle operated on the campuses by students enrolled in the Divinity School must be registered at 05 Allen Building within 5 days after arrival, and thereafter must display the proper registration emblem. To register a vehicle the student must present the following documents:

1. State vehicle registration.
2. State operator's license.
3. Evidence of automobile liability insurance as required by North Carolina law: $5,000 per person and $10,000 per accident for personal injuries; and $5,000 property damage.

An annual car registration fee of $30.00 is required of unmarried students resident in dormitories.

Parking, Traffic, and Safety Regulations will be given each student registering his vehicle. Students are expected to abide by these regulations.

# Financial Aid

The primary purpose of a financial aid program is to provide assistance, within limits, to students who demonstrate financial need. Financial need is defined as the difference between the total cost of attending a particular institution and the amount of resources available to the student. Financial assistance may consist of scholarships, loans, tuition grants, grants-in-aid, and employment, which may be worked out in various combinations.

Financial assistance is granted on the basis of need on a year-to-year basis, with reapplication and review each year.

Students are expected to be able to finance themselves for the first semester of work in the Divinity School. Those who show that they can carry their school work satisfactorily and who demonstrate need are then eligible to apply for various forms of financial assistance as described below under III and IV. Financial resources may be any or all of the following:

I. PERSONAL. In order that both the Church and the Divinity School may be able to extend the use of their limited funds to as many students as possible, a student who is desirous of a theological education should be willing to provide insofar as possible for the cost of such education from his own resources. These may be savings and earnings, gifts from family and friends, and, if married, earnings of spouse and gifts from parents of spouse. In calculating anticipated income, the student first considers his own resources.

II. CHURCH. Many local churches and conferences provide gifts and grants for theological education. Often the student makes direct application for these funds.

In recent years many Methodist Annual Conferences have established Ministerial Training Funds for the purpose of providing "service loans" to theological students to help defray the costs of tuition, fees, and other academic requirements. The service loans are repaid in "years of service" rather than in cash. The student makes application to his own Annual Conference.

III. THE DIVINITY SCHOOL

A. Scholarships

1. National Methodist Scholarships: Two National Methodist Scholarships, having a cash value of $500 each, are made

available annually by the General Board of Education of the Methodist Church to two outstanding students in the first year class. Awards are granted by the General Board of Education upon the recommendation of the faculty. Students receiving these awards are required to participate in a two-weeks' expense paid travel seminar during which they visit and study all of the boards and agencies of the Methodist Church located in Nashville, Chicago, New York City, Washington, and Philadelphia.

2. Senior Honor Scholarships: Each year a limited number of Honor Scholarships are awarded to rising seniors who have achieved academic excellence and who give unusual promise of service in the pastoral ministry.

3. Foreign Student Scholarships: In cooperation with the Crusade Scholarship Committee of the Methodist Church and other authorized church agencies students are admitted to courses of study. Scholarships for such students are provided from the Lewis Clarence Kerner Scholarship Fund and from local Methodist churches and friends.

B. Tuition Grants: Tuition grants in varying amounts, commensurate with need, are available upon application to the Committee on Scholarship and Financial Aid. Entering students may apply at the time of making application for admission. Those whose applications are received prior to February 1 should receive notice of the Committee's action not later than February 20. Those whose applications are received after February 1 will be notified as rapidly as their cases can be reviewed.

Currently enrolled students who are eligible for consideration must apply in November or December prior to the academic year for which a tuition grant is requested.

All applicants should understand that tuition grants will vary in amount according to need and are subject to review either at the initiative of the student or that of the Committee on Scholarship and Financial Aid at the time of Fall matriculation.

C. Grants-in-Aid: A Grant-in-Aid is a monetary grant made available to a student who chooses to make participation in the Endowment and Field Work Program an integral part of his seminary education and who sincerely wishes to render a service in a local church or church institution. The student may, after having been accepted by the Divinity School as a

regularly enrolled student, apply to the Committee for the privilege of participating in the program.

The Grant-in Aid program includes the following:

1. Summer Assistant Pastors: Students may apply during the fall semester (November) requesting approval to participate in the Summer Endowment and Field Work Program as Assistant Pastors. Upon request of churches, students are assigned to serve 10 weeks (or five, by special agreement) and in return they receive their room and board for the period of service and grants-in-aid up to $800. Married students whose wives work must be prepared to go without their wives. A limited number of entering students can be assigned; however, prior consideration is given to rising Middler and Senior students. Students transferring to another seminary are not eligible for assignment the summer prior to transfer.

   Address correspondence to: Endowment and Field Work Committee, Box 4814, Duke Station, Durham, N.C.

2. Winter Assistant Pastors: Any student who is not serving as a student pastor, may be assigned to serve as a part-time assistant in a local church or related agency during the period of the regular academic year, September through May. Applications for such assignments must be made to the Endowment and Field Work Committee at least thirty days in advance of the opening of the autumn semester each year. Students assigned to these positions agree to engage in a specified number of hours of field service each week and in turn they receive grants-in-aid in varying amounts. Assistant pastors and those doing special work are expected to keep their daily travel as low as possible. (Note additional statement in Section on Field Work.)

3. Student Pastors: The Divinity School does not appoint pastors to churches but serves as the liaison agency between the church and the student. The Director of Field Work, or his representative, advises with students regarding opportunities for pastorates and in turn offers information and recommendations to church officials regarding students who are eligible to be assigned to pastorates. No student can serve as a student pastor without the written approval of the Director of Field Work. Salaries and other forms of support are arranged by church officials in keep-

ing with denominational policies and are reported to the Divinity School.

Student Pastors may be enrolled for not less than eight or more than 12 hours of academic work in any given semester. (See pages 35 and 63).

If the charge being served is located beyond 50 to 55 miles distance from the campus, the students are required to take a residence in Durham or vicinity during the academic work week, Monday 2 p.m. through Friday, 4 p.m. Correspondence concerning a student pastorate should be addressed to: Director of Field Work, Box 4353, Duke Station, Duham, N.C.

IV, Loans: Loan Funds held in trust by the University, as well as Methodist Student Loans and funds supplied by the Federal Government through the National Defense Education Act of 1958, are available to qualified students.

Loans generally mature after the borrowers have left the University. Loan interest on long term loans from University funds accrues at the rate of 1% from the date of each note. After a student has left the University permanently, the loans begin bearing interest at the rate of 3% per annum. The balance unpaid after five years bears interest at the rate of 6% per annum.

Loan applications must be submitted not later than July 1 preceding the academic year for which assistance is requested and must be approved by the Committee on Scholarship and Finance.

*Note:* Unless otherwise indicated all correspondence concerning financial aid should be directed to: Financial Aid Office, The Divinity School, Box 4814, Duke Station, Durham, N.C. All applications will be reviewed by and all financial aid approved by the Committee on Scholarships and Financial Aid.

V. Employment: There are a number of opportunities during the academic year for part-time non-church employment on the Duke Campus and in the City of Durham. Students or wives needing this type of employment must make their own arrangements with employers and must plan their work schedules so as not to be denied full participation in the educational and cultural opportunities of the Divinity School.

Students or wives desiring employment with the University should apply to the Director of Personnel, Duke Station, Durham, North Carolina. 01, Allen Bldg.

# Field Work

*Its Nature and Purpose.* Field work is conceived to have a two-fold nature. (1) It is a symbol of a mutual relationship between the seminary and the local church, and it is an effective way of declaring and implementing the purpose of the seminary to serve the church as well as the student. (2) It is a vital part of the total education of the theological student, assisting him in understanding the nature and task of the church and in testing his motivation and fitness for the vocation of the ministry.

More specifically it is the purpose of field work: (1) to assist the student in understanding the nature and task of the local church; (2) to study some of the practical problems involved in the care of the parish; (3) to afford an opportunity for the progressive development of the student's knowledge and ministerial skills through responsible participation in the life of the church; (4) to contribute leadership to churches in the region, especially those having need for part-time workers.

*Types of Field Work.* (1) Student pastors, appointed by conferences or other official agencies of a recognized denomination. A student must have the approval of the Director of Field Work, as the agent of the Dean, before accepting an appointment as a student pastor. (2) Winter assistant pastors, assigned by the Director of Field Work, in consultation with the pastor and/or other leaders of local churches, to serve during the academic year. (3) Other church-related positions, such as teaching church school classes, counseling youth groups, scouting and recreation. (4) Summer assistant pastors under the Endowment and Field Work Program. This is a program of ten weeks' service in Methodist rural charges of North Carolina, under the appointment and supervision of the Director of the Work of the Rural Church, in cooperation with district superintendents and pastors. All students serving in this program must secure credit for Practicum II and participate each year in the preparatory training sessions, planned by the Duke Endowment Student Association in collaboration with the Director of the Work of the Rural Church.

*Supervision.* The chief supervisors of the Duke field work program are the Director of Field Work and the Director of the Work of the Rural Church under the Duke Endowment. Associated with them are other members of the administrative and teaching staff of the

Divinity School, district superintendents and pastors, denominational executive secretaries and graduate students in religion.

Supervision is carried on through: (1) Practicum I, required in the first semester of service as a student pastor, and Practicum II, required of all students working in the Summer Endowment and Field Work Program; (2) Regular visits by supervisors to charges served by student pastors and assistant pastors, followed by student-supervisor conferences; (3) Seminars (one day) for supervisors; (4) Regular reports from all students and charges to the Endowment and Field Work Offices.

*The Time Element of Field Work.* (1) While the student pastor carries a reduced academic load (see page 35) his divinity studies provide his chief concern and occupation. The amount of time given to parish responsibilities is necessarily limited. (2) It is expected that students serving as assistants during the academic year will be limited ordinarily to 12 to 15 hours of field service per week. A more extensive responsibility beyond such a number of hours will require the student to reduce his academic load. (3) Students serving as church school teachers, youth counselors, and in similar positions are ordinarily expected to devote no more than 3 to 6 hours to this service per week.

# Scholarship Resources

Certain special funds have been established, the income from which is used to provide financial aid through scholarships and grants-in-aid for students wishing to secure training in preparation for the Christian ministry. The resources listed below include endowed funds and sources of annual contributions.

### R. Ernest Atkinson Legacy

In 1952, under the will of the Reverend R. Ernest Atkinson of Richmond, Virginia, a member of the Trinity College Class of 1917, a sum of money was given to the Divinity School, the income to be used for the benefit of the School.

### Mary Reynolds Babcock Foundation Scholarships

Through the generosity of the Mary Reynolds Babcock Foundation of Winston-Salem, North Carolina, a limited number of scholarships in an amount not exceeding $1,400 per year are granted to students in candidacy for the B.D. degree, on nomination and decision of the Dean and Committee on Scholarships and Financial Aid.

### E. M. Cole Fund

In 1920 Mr. Eugene M. Cole, a Methodist layman, of Charlotte, North Carolina, established the E. M. Cole Fund the proceeds from which are to be used in providing assistance for ministerial students.

### The Duke Endowment

Among the beneficiaries of The Duke Endowment are the rural Methodist Churches of the two North Carolina Conferences. Under the Maintenance and Operation Program grants-in-aid are available for Duke Divinity School students to serve as assistant pastors under the Endowment and Field Work Program.

### N. Edward Edgerton Fund

In 1939 Mr. N. Edward Edgerton of Raleigh, North Carolina, an alumnus of Duke University of the Class of 1921, a member of the Board of Trustees of the University, established the N. Edward Edgerton Fund. The award is limited to students who are candidates for the B.D. degree.

### Thomas Jefferson Finch Scholarship

In 1955 Mr. George Davis Finch, '24, and Mr. Brown Faucette Finch, '54, established an annual scholarship in the amount of $650 a year in memory of Mr. Thomas Jefferson Finch, Trinity College Class of 1884, who was the father and grandfather of the donors.

### The James A. Gray Fund

In 1947 Mr. James A. Gray of Winston-Salem, North Carolina, presented the fund, which bears his name, to the Divinity School for use in expanding and maintaining its educational services in behalf of North Carolina churches and pastors. From this fund three scholarships are awarded; two in city church work, and one in rural church work. The Divinity School Seminars and a number of scholarships in the School for Supply Pastors are also supported by income from this gift, as well as the James A. Gray Lectures.

### P. Huber Hanes Scholarship

Mr. P. Huber Hanes of Winston-Salem, North Carolina, an alumnus of Duke University of the Class of 1900, has established for Duke University an annual scholarship fund, a portion of which is used to provide financial assistance for Divinity School students.

### George M. Ivey Scholarship Fund

This fund was established December 8, 1948, by gift of George M. Ivey, of Charlotte, North Carolina, an alumnus of Duke University of the Class of 1920, the income to be used for scholarship aid for deserving students in the Divinity School.

### Lewis Clarence Kerner Scholarship

This scholarship fund was established May, 1959, by Beatrice Kerner Reavis, of Henderson, North Carolina, in memory of her brother, Lewis Clarence Kerner. The income from the principal of this fund is designated for the assistance of native or foreign-born students preparing for service in world Christian missions.

### Laurinburg Christian Education Fund

This fund was established December 11, 1948, by gift through the Methodist College Advance Fund, the income to be used for scholarship aid for worthy students of the Divinity School.

### Myers Park Scholarship Fund

The Myers Park Scholarship Fund was established in 1948 by contributions of the members of the congregation of the Myers Park Methodist Church, Charlotte, North Carolina, the income to be used for the benefit of the Divinity School.

### W. R. ODELL SCHOLARSHIP

In 1946 the Forest Hills Methodist Church, Concord, North Carolina, established a scholarship fund in memory of W. R. Odell, for many years a member of the Board of Trustees of the University.

### JESSE M. ORMOND SCHOLARSHIP FUND

In 1948 the North Carolina Conference established a fund in honor of Professor Jesse M. Ormond, who for many years was Director of Field Work in the Divinity School and Professor of Practical Theology.

### GILBERT T. ROWE MEMORIAL SCHOLARSHIP FUND

The Gilbert T. Rowe Memorial Scholarship Fund was established through the generosity of Divinity School Alumni and friends of the late Gilbert T. Rowe. The interest on this fund is employed annually for a limited number of senior honor scholarships. Rising senior students with exceptional records and promise of usefulness in the Christian ministry are eligible for grants under this scholarship program.

### ELBERT RUSSELL SCHOLARSHIP

In 1942 the Alumni Association of the Divinity School established a scholarship fund in honor of Elbert Russell, late Dean of the Divinity School and for a number of years Professor of Biblical Theology.

### HERSEY E. SPENCE SCHOLARSHIP

In 1947 the Steele Street Methodist Church of Sanford, North Carolina, established a scholarship fund in honor of Professor Hersey E. Spence, a former pastor of the congregation, the income to be used for scholarship aid to deserving students of the Divinity School.

### THE METHODIST CHURCH

The Methodist Church makes a substantial contribution to the Divinity School by designating a certain percentage of its World Service offerings to the school.

The North Carolina and the Western North Carolina Conferences direct a certain percentage of their College Sustaining Funds to the Divinity School. The South Carolina Conference is a contributor to the Divinity School operational income.

The General Board of Education makes available annually two National Methodist Scholarships having a cash value of $500 each. (See pages 58-59).

Local Methodist churches throughout the Southeast make contributions to the scholarship funds of the Divinity School, thus making

it possible to assign students under the Endowment and Field Work Program to urban and out-of-state churches.

### The Methodist College Advance

The Divinity School was a participant in the North Carolina Methodist College Advance with askings of $200,000 for scholarship aid and extension of the School's service to ministers. Many local churches and individuals have shared in the raising of this significant sum. Specific contributions are the Henry Harrison Jordan Loan Library, the James A. Gray Fund, the J. M. Ormond Fund, the Laurinburg Christian Education Fund, the Hersey E. Spence Fund, and the Myers Park (Charlotte, North Carolina) Methodist Church Fund.

### Dempster Graduate Fellowships

The Methodist Board of Education offers each year the Dempster Graduate Fellowships for graduates of Methodist Theological Schools, who are engaged in programs of study leading to the degree of Doctor of Philosophy in Religion with a view to teaching in Methodist colleges and seminaries. Several Divinity School graduates have held these fellowships.



ENTRANCE TO THE DIVINITY SCHOOL

# The Summer Session of the Divinity School

## *Summer, 1964*

**Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.**

**FIRST TERM: (Registration on June 9—Classes begin on June 10)**

110 (DS). THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 11:00-12:20. 3 s.h. ROBINSON

120 (DS). FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles' the Nicene and the Chalcedonian Creeds in their contemporary setting. 7:40-9:00. 3 s.h. GRISLIS

337 (DS). THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 9:20-10:40. 3 s.h. HILLERBRAND

**SECOND TERM: (Registration on July 16—Classes begin on July 17)**

105 (DS). STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 7:40-9:00. 3 s.h. EFIRD

153 (DS). PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 9:20-10:40. 3 s.h. INGRAM

190 (DS). THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 11:00-12:20. 3 s.h. LACY

# Enrollment 1963-64

## *Fall and Spring Semesters*

### CANDIDATES FOR THE BACHELOR OF DIVINITY DEGREE

Aiken, David Hubert (B.A., Baylor University), Atlanta, Ga.
Albury, George Richard (B.A., Williams College), Coral Gables, Fla.
Aldridge, Julian McClees, Jr. (A.B., Davidson College), Rocky Mount, N. C.
Alexander, Robert Earl (A.B., Duke University), Kinston, N. C.
Allen, Harry A. (B.S., Wofford College), Charlotte, N. C.
Allen, John Cornelius III (A.B., Duke University), Burlington, Vt.
Allport, Henry Braxton, Jr. (B.A., Randolph-Macon College), Alexandria, Va.
Ambrose, Kenneth Paul (A.B., West Virginia Wesleyan College), Belle, W. Va.
Ameling, John Frederick (B.S., B.A., Kent State University) Brecksville, Ohio
Amon, Ronald David (B.A., Mount Union College), Beaver Falls, Pa.
Anderson, Thurman Wilson (A.B., Wofford College), Conway, S. C.
Andrews, John Cleveland (A.B., East Carolina College), Ayden, N. C.
Attkisson, C. Clifford, Jr. (A.B., University of Richmond), Richmond, Va.

Ballard, James Donald (A.B., Shaw University), Winston-Salem, N. C.
Baxter, David Livingston (A.B., High Point College), High Point, N. C.
Belzer, F. Elaine (A.B., Union College), Magnolia, N. J.
Benfield, Jack Monroe (A.B., High Point College), Henderson, N. C.
Billings, James Wayne (B.A., Pfeiffer College), Bonlee, N. C.
Boggan, Robert Edmond, Jr. (A.B., Wofford College), Greensboro, N. C.
Bolyard, Roy Vance, Jr. (B.A., West Virginia Wesleyan College), Charleston, W. Va.
Bouknight, William Reuben III (A.B., Duke University), West Columbia, S. C.
Bowles, Joseph Cates (A.B., Duke University), Charlotte, N. C.
Bradshaw, Francis C. (A.B., Duke University), Durham, N. C.
Braswell, Kermit Lee (A.B., University of North Carolina), Henderson, N. C.
Britt, William Donald (A.B., Wofford College), Marion, S. C.
Brown, Billy Bowman (A.B., Wofford College), Black Creek, S. C.
Brown, Harold Berger, Jr. (A.B., University of Chattanooga), Atlanta, Ga.
Brusati, John F. (B.A., Southwestern College), Elmhurst, Ill.
Bryan, James Lawson (A.B., Duke University), Silk Hope, N. C.
Bryan, Robert Samuel (B.A., Wake Forest College), Ahoskie, N. C.
Bucey, Karl Lester (A.B., Muskingum College), McConnelsville, Ohio
Bucklew, Neil Sherman (A.B., University of Missouri), Evans City, Pa.
Buie, Franklin Burgess (A.B., Wofford College), Columbia, S. C.
Burberry, Clyde David II (A.B., Kentucky Wesleyan College), Paris, Ky.

Cadmus, Harold Russell (B.S., University of Pennsylvania), Thorofare, N. J.
Cain, Louie Bingham, Jr. (A.B., Lambuth College), Camden, Tenn.
Caldwell, James Franklin (B.A., Tulsa University), Tulsa, Okla.
Callahan, John Paul (A.B., Wofford College), Lexington, S. C.
Cameron, Hugh Harris (A.B., High Point College), Roanoke Rapids, N. C.
Capehart, Albert Cowardin, Jr. (B.A., Pfeiffer College), Richmond, Va.
Carlisle, Fred Albert, Jr. (A.B., Lenoir Rhyne College), Climax, N. C.
Carney, Frank Godwin (B.A., Millsaps College), Crystal Springs, Miss.
Campbell, Robert B. (B.A., Columbia College), Jackson Springs, N. C.
Cassady, Tommy Lee (A.B., Wofford College), Charlotte, N. C.
Cavin, David Schubert (A.B., University of Chattanooga), Lafayette, Ga.
Charlesworth, James Hamilton (B.A., Ohio Wesleyan University), Ponte Vedra Beach, Fla.
Clanton, Robert Alpheus, Jr. (A.B., Pfeiffer College), West Hillsboro, N. C.
Clark, Charles Clifford (A.B., Morris Harvey College), Clendenin, W. Va.
Clark, Richard (A.B., University of North Carolina), Statesville, N. C.
Cohen, Conrad M. (A.B., Western Maryland College), Milford, Del.
Coleman, Gerald Price (B.A., Grand Canyon College), Lynchburg, Va.
Cook, Jerry O'Neil (A.B., Wofford College), Startex, S. C.
Cox, Boyce Vernon (B.A., Wake Forest College), Winterville, N. C.
Cunningham, Lloyd Thomas (B.A., Florida Southern College), Miami, Fla.

Dail, Francis Earl (A.B., High Point College), Kinston, N. C.
Daily, Thomas C. (B.A., Emory and Henry College), Santo Domingo, Dominican Republic
Damschroder, Linden W. (B.A., Adrian College), Elmon, Ohio
Davenport, John Paul (B.S., Appalachian State College), Newland, N. C.
Davis, Hubert Trevelyan (B.S., University of Alabama), Troy, Ala.
Davis, Joe Cliff (A.B., Lenoir Rhyne College), Ellenboro, N. C.
Davis, Melvin Ott (B.A., Emory and Henry College), Alberta, Va.

Dickerson, Dennis Roy, Jr. (A.B., Wofford College), Spartanburg, S. C.
Dorsey, John Matthew (A.B., Pfeiffer College), Charlotte, N. C.
Dowda, Robert Ellis (B.A., Birmingham-Southern College), Birmingham, Ala.
Dutton, Denis Chandraraj (B.A., Ohio Wesleyan College), Kuala Lumpur, Malaysia

Eanes, Ralph Hill, Jr. (A.B., University of North Carolina), Thomasville, N. C.
Earnhardt, Daniel T. (A.B., High Point College), Durham, N. C.
Eidenier, Elon Gerald (A.B., Lycoming College), Arcade, N. Y.
Ellison, William Byrd (A.B., High Point College), Summerfield, N. C.
Embry, Foster Alvin, Jr. (A.B., Georgia State College), Marietta, Ga.

Falls, Fred (A.B., Pfeiffer College), Kings Mountain, N. C.
Felder, Charles B. (B.A., Millsaps College), Liberty, Miss.
Fenstermann, Duane Wellington (B.A., Morningside College), Sioux City, Iowa
Fortenberry, Donald Peyton (B.A., Millsaps College), Summit, Miss.
Foster, Samuel Stephen (B.A., Illinois Wesleyan University), Eagle, Wis.
Fox, Carol Rogers (B.A., Duke University), Roxboro, N. C.
Frame, David James (B.A., Drew University), Philadelphia, Pa.
Freitas, Daniel P. (A.B., Union College), Braintree, Mass.

Gaffron, David William (B.S., University of Illinois), Decatur, Ill.
Gamble, Harry Yandle, Jr. (B.A., Wake Forest College), Roanoke, Va.
Gardner, Carlos Owen (A.B., Pembroke State College), Chadbourn, N. C.
Gensel, Thomas Edward (A.B., Fairmont State College, M.A., Marshall University) Shineston, W. Va.
Gillis, Raymond Franklin, Jr. (B.A., Randolph-Macon College), Hampton, Va.
Goh, Francis Swee Huat (B.A., West Virginia Wesleyan College), Penang, Malaysia
Gragg, James Printest (B.A., Oklahoma City University), Altus, Okla.
Griffith, Lloyd Edward, Jr. (A.B., Duke University), Wadesboro, N. C.
Grove, John Wesley (A.B., Western Maryland College), Baltimore, Md.
Gventer, Henry William (B.S., Queens College, M.S., West Virginia University), New York City, N. Y.

Hayes, Jonn S. (A.B., Randolph-Macon College), Essex County, Va.
Hall, Elmer O. (A.B., High Point College), Gibsonville, N. C.
Hamilton, Wayne Bruce (B.S., Wake Forest College), Washington, D. C.
Hanson, John Bruce (A.B., West Virginia Wesleyan College), Rye, N. Y.
Harmon, Samuel Kaiser (A.B., Wofford College), Lexington, S. C.
Harper, Eugene James (A.B., Wofford College), Chesnee, S. C.
Hayward, Donald M. (A.B., Princeton University), Loveland, Colo.
Heafner, James Patrick (A.B., Pfeiffer College), Shelby, N. C.
Heitzenrater, Richard Paul (A.B., Duke University), Clarion, Pa.
Hendricks, Melvin Elton (A.B., Wofford College), Ridgeland, S. C.
Herman, James Franklin (B.A., Pfeiffer College), Sanford, N. C.
Hewett, James Allen (B.A., Duke University), Shallotte, N. C.
Hicks, Charles Mack (A.B., Union College), Trenton, N. J.
Higginbotham, John Avon (B.A., Millsaps College), Canton, Miss.
Hilton, David Lee (A.B., Kentucky Wesleyan College), Maysville, Ky.
Himes, John Robert (A.B., Wittenberg College), Newark, Ohio
Holliday, Richard Carrington (A.B., Morris Harvey College), Belle, W. Va.
Howard, Thomas J. (A.B., High Point College), Kernersville, N. C.
Huggins, Hubert Sydney (A.B., University of North Carolina), Rockingham, N. C.
Huntington, Warren Fielding (A.B., University of Miami), Hialeah, Fla.
Hutchinson, William Wayne (B.A., University of Oklahoma), Hobbs, N. M.

Ivey, Daniel Keith (B.A., New Mexico State University), Las Cruces, N. M.

Jamison, Louis D. (A.B., Wofford College), North Charleston, S. C.
Jayroe, Harold Benjamin (A.B., Wofford College), Georgetown, S. C.
Johns, Charles Eugene (B.S., Wilkes College), Pittston, Pa.
Jones, Aubrey Alling (A.B., Emory University), Milledgeville, Ga.
Jones, Daniel Webster, Jr. (B.A., Elon College), Haw River, N. C.
Jones, Royce Paul (B.A., Texas Christian University), Garland, Tex.
Juren, Jerry Jay (A.B., Atlantic Christian College), Wallace, N. C.

Kelly, Lawrence Anthony, Jr. (B.A., Coker College), Charleston, S. C.
Kerr, William Andrew (A.B., West Virginia University), Morgantown, W. Va.
Kim, Myung J. (B.A., Randolph-Macon College), Richmond, Va.
Kirk John Alan (A.B., Evansville College), Oblong, Ill.
Knott, John Buxton III (A.B., University of North Carolina), Durham, N. C.
Koonts, Ronald Alva (A.B., University of North Carolina), High Point, N. C.
Kyle, William Reid, Jr. (B.A., Randolph-Macon College), Hampton, Va.

La Torre, Stanley Edward (B.S., The College of Charleston), Charleston, S. C.
Ledbetter, Don Kelly (A.B., Greensboro College), Troy N. C.
Leonard, Paul Edward, Jr. (B.A., Randolph-Macon College), Roanoke, Va.
Lewis, David Benjamin (A.B., University of Virginia), Richmond, Va.
Lewis, Weller Ross, Jr. (A.B., West Virginia Wesleyan College), Hoopersville, Md.
Lindsley, James Bruce (B.S., Mount Union College), Alliance, Ohio
Lineberger, James Worth, Jr. (B.S., North Carolina State College), New Bern, N. C.
Livermon, William Raynor, Jr. (B.A., Randolph-Macon College), Martinsville, Va.

Long, James Baxter, Jr. (A.B., Pfeiffer College), Concord, N. C.
Lovell, Eugene Hendrix, Jr. (B.A., Emory and Henry College), Old Hickory, Tenn.
Lovell, James Peter (B.A., Duke University), Oak Park, Ill.
Lovell, William Eugene (B.A., Emory and Henry College), Nashville, Tenn.
Ludlum, Sara Lee (B.A., Wake Forest College), Wilmington, N. C.

McBride, Robert Green (B.A., University of Florida), West Palm Beach, Fla.
McKinley, Billy Shaw (A.B., McMurry College), Durham, N. C.
McMahan, William Franklin (B.A., Randolph-Macon College), Salem, Va.
Maddry, Hubert Alexander, Jr. (A.B., Scarritt College), Durham, N. C.
Mahon, William Floyd (B.A., Randolph-Macon College), Springfield, Va.
Mahone, Donald Ray (B.A., Emory and Henry College), Bluefield, Va.
Manges, Suzanne Heath (A.B., Agnes Scott College), Blacksburg, Va.
Mann, Sam E. (B.A., Birmingham-Southern College), Eufaula, Ala.
Manthey, Robert Edward (A.B., Western Maryland College), Baltimore, Md.
May, Harold L. (A.B., West Virginia University), Lakeland, Fla.
Meeks, Merrill Douglas (A.B., Southwestern at Memphis College), Memphis, Tenn.
Miller, William Donald (A.B., West Virginia Wesleyan College), Fairmont, W. Va.
Monson, Robert Clyde (B.A., Wofford College), Florence, S. C.
Montford, Charles Harold (B.A., Florida State University), Chattahoochee, Fla.
Morgan, Robert Whittelsey (A.B., M.A., Duke University), Durham, N. C.
Morris, W. Robert (A.B., Wofford College), Lake View, S. C.
Morton, Fred Clare (A.B., Princeton University), Memphis, Tenn.
Mullinix, George Roland (A.B., Lenoir Rhyne College), Connelly Springs, N. C.
Murphy, Ervin Thomas, Jr. (B.A., Randolph-Macon College), Norfolk, Va.

Neaves, Norman Earl (B.A., Oklahoma City University), Oklahoma City, Okla.
Nelson, Gordon Vernon, Jr. (B.A., Randolph-Macon College), Colonial Heights, Va.
Nickle, William Edwin (B.A., Emory and Henry College), Knoxville, Tenn.
Nobles, William Michael (B.S., Richmond Professional Institute), Portsmouth, Va.
Norman, John Phillip (A.B., Erskine College), Homeland, Fla.
Norred, Jimmy Jerry (B.A., LaGrange College), LaGrange, Ga.
Norris, Frank Bonnie (A.B., Davidson College), Gastonia, N. C.

Oliver, James Ralph (Duke University), Fairmont, N. C.
Otte, Frederick Lewis (B.A., Mississippi College, M.S., University of Southern Mississippi), Jackson, Miss.
Owen, Travis Winefred (A.B., Pembroke State College), Council, N. C.

Parchman, Russell Carver (B.A., McMurry College), Loving, N. M.
Park, George Helm (B.S.F., University of Florida), Jacksonville, Fla.
Parmley, Ingram C. (A.B., M.A., Scarritt College), Tracy City, Tenn.
Parsons, Barbee Olis (A.B., Coker College), Hemingway, S. C.
Peterson, Francis Gerald (A.B., Boston University), Chicago, Ill.
Peurifoy, Clarence Edward (A.B., Greensboro College), Concord, N. C.
Pharr, Philip Allen (A.B., Pfeiffer College), Statesville, N. C.
Piel, William Louis (A.B., Dickinson College), Woodlawn, Md.
Pierce, Fred Perry (B.S., University of North Carolina), Burlington, N. C.
Pollock, George Lee (A.B., Guilford College), Thomasville, N. C.
Poole, Christopher Lee (B.S., College of Charleston), Wagener, S. C.
Pope, Cletes Alfred (A.B., Greensboro College), Greensboro, N. C.
Prince, Richard Emory (B.A., Randolph-Macon College), Newport News, Va.

Ramke, Ronald George (A.B., Union College), New York City, N. Y.
Randolph, William Pierce (A.B., Birmingham-Southern College), Franklin, Tenn.
Reese, Malcolm Cephus, Jr. (A.B., Western Carolina College), China Grove, N. C.
Reskovac, John William (B.A., Oklahoma City University), Oklahoma City, Okla.
Richichi, Thomas Joseph (B.A., Oklahoma City University), Oklahoma City, Okla.
Ridout, Edward Martin (A.B., Duke University), Durham, N. C.
Romine, Ben Houston, Jr. (B.A., Florida State University), Quitman, Ga.
Ross, Richmond Allan (B.A., Duke University), Durham, N. C.
Rouse, Benjamin Charles (A.B., High Point College), Kinston, N. C.
Ruth, William Albert (A.B., University of North Carolina), Cary, N. C.

Sabiston, William Devine III (B.A., University of North Carolina), Carthage, N. C.
Sell, Jesse Jeremiah (A.B., Ohio Wesleyan University), Toledo, Ohio
Settle, Carl E. (B.A., Hendrix College), Little Rock, Ark.
Setzer, John William, Jr. (B.A., The Citadel), Marion, N. C.
Shannon, Sylvester Lorenzo (B.S., Florida A & M University), Saint Petersburg, Fla.
Sharp, Robert Thomas (A.B., Millsaps College), Meridian, Miss.
Sharpe, Jack Larry (A.B., Birmingham-Southern College), Langdale, Ala.
Sharpe, John L. III (A.B., Wofford College), Columbia, S. C.
Sigmon, Thomas Ralph (A.B., Lenoir Rhyne College), Hickory, N. C.
Skaar, Arnold Harry (A.B., Bucknell University), Princeton, N. J.
Sledge, Donald Dennis (A.B., Marion College), South Norfolk, Va.
Smith, Charles Michael (A.B., Duke University), Washington, N. C.
Smith, Samuel Steve (B.S., University of Tennessee), Livingston, Tenn.
Smith, Wayne Reece (A.B., University of North Carolina), Charlotte, N. C.
Snodgrass, Evan Granville, II (A.B., Union College), Harrison, Ohio
Spake, William M. (A.B., High Point College), Asheville, N. C.

Spragens, Thomas Arthur, Jr. (B.A., Wesleyan University), Danville, Ky.
Steed, Roy Glenn, Jr. (A.B., High Point College), Ca-Vel, N. C.
Steuart, Thomas Albert (B.S., University of Florida), Tampa, Fla.
Stewart, Carl Oscar (B.A., Shepherd College), Oakton, Va.
Stith, Frank Albert, III (A.B., Duke University), Winston-Salem, N. C.
Stokes, Clarence O. (B.A., St. Andrews College), Camden, S. C.
Stone, Samuel Marion IV (A.B., Duke University), Charleston, W. Va.
Suzuki, Yugo (B.A., Randolph-Macon College), Tokyo, Japan
Swann, Marion Milton (A.B., Pfeiffer College), Spruce Pine, N. C.

Taggart, James Edward (B.A., Baldwin-Wallace College), Bellevue, Ohio
Taylor, Oliver Franklin (B.A., Florida Southern College), Miami, Fla.
Thomas, John Rex (A.B., Elon College), Sanford, N. C.
Thomas, Harmon Edward (B.S., A. & T. College of North Carolina), Bryson City, N. C.
Thompson, Albert E., Jr. (A.B., High Point College), Raleigh, N. C.
Turner, Clay Howard (B.A., Southern Methodist University), Mobile, Ala.
Turner, Frank Blair (B.A., Pfeiffer College), Midland, N. C.
Tyndall, Leslie Glenn (A.B., Duke University), Kinston, N. C.

Underwood, James S., Jr. (B.A., Stetson University), Perry, Fla.

Van Hook, Robert Matthew II (B.A., Hendrix College), El Dorado, Ark.

Wachs, William Ronald (A.B., High Point College), Pittsboro, N. C.
Walker, James Lynwood (B.A., North Carolina College), Fayetteville, N. C.
Wallace, Robert Louis (B.A., Mississippi Southern College), Efland, N. C.
Ward, Herman Nathan, Jr. (B.S., North Carolina State College), Whiteville, N. C.
Watson, Grayson Bernard (A.B., Centenary College of Louisiana), W. Monroe, La.
Webb, James Henry (B.S., Mississippi State University), Noxapater, Miss.
Weekley, James Frederick (A.B., Marshall University), Huntington, W. Va.
Weidman, Judith Lynne (B.A., DePauw University), Savanna, Ill.
Wertenberger, Nevil Lee (B.A., Youngstown University), Deerfield, Ohio
Wilder, Henry Milton, Jr. (A.B., University of North Carolina), Sanford, N. C.
Wilkinson, Howard Milton (B.S., North Carolina State College), Raleigh, N. C.
Wilkins, Lafayette Thomas, Jr. (A.B., Elon College), Suffolk, Va.
Williams, Hollis (A.B., Hendrix College), Arlington, Va.
Williams, Johnnie Joseph, Jr. (B.A., Guilford College), Rocky Mount, N. C.
Wilson, Arthur John (A.B., Duke University), Durham, N. C.
Wilson, Jerry Bryan (B.A., Wake Forest College), Statesville, N. C.
Wilson, Leighton Marion, Jr. (B.A., Furman University), Tampa, Fla.
Wilson, Ronald Lynn (B.S. in Pharmacy, Howard College), Birmingham, Ala.
Winegar, Grady Clarence (B.A., Emory and Henry College), Gate City, Va.
Winter, David Earl (B.A., West Virginia Wesleyan College), South Charleston, W. Va.
Wogan, Sidney F. (LL.B., Southeastern University), New Orleans, La.
Wood, Roger Wayne (A.B., Wofford College), Spartanburg, S. C.
Woodall, Edward Eugene, Jr. (B.A., Millsaps College), Coffeeville, Miss.
Woodard, Louis Herman (B.A., Wake Forest College), Kinston, N. C.
Woodward, James Richard (B.S., Livingstone College), Avondale, Pa.
Wortman, Manuel David (A.B., High Point College), Lawndale, N. C.

Yeo, Lawrence Thomas (B.A., Wesleyan University), Newton, Mass.

Zikmund, Barbara Brown (B.A., Beloit College), Detroit, Mich.
Zimmerman, Matthew Augustus, Jr. (B.S., Benedict College), Union, S. C.

## CANDIDATES FOR THE DEGREE OF MASTER OF RELIGIOUS EDUCATION

Albritton, Annelle (A.B., Southwestern-at-Memphis), Jackson, Miss.
Allen, Joan Gelinda (A.B., Millsaps College), Flemingsburg, Ky.
Arichea, Ruth Mandac (B.R.E., Union Theological Seminary (Manila)), Gattaran, Cagayan, Philippines
Bradley, Sarah Lucretia (A.B., Greensboro College), Lenoir, N. C.
Chance, Dorathy Mae (A.B., Pfeiffer College), Lumberton, N. C.
Carney, Carol Hayward (B.A., Oklahoma City University), Shawnee, Okla.
Huggins, Dennis Burke (B.A., Randolph-Macon College), Kalispell, Mont.
Smith, Orba Lee (A.B., Atlantic Christian College), Bolton, N. C.
Vensel, Carol Lee (A.B., Mount Union College), New Kensington, Pa.
Winegar, Ottalee Smith (B.A., Emory and Henry College), Gate City, Va.

## SPECIAL STUDENTS

Abernathy, Doris Virginia (A.B., Lenoir Rhyne College), Hickory, N. C.
Bomstad, Roland G., Jr. (B.S., B.A., University of Florida), Gainesville, Fla.
Clements, John Lester (A.B., M.E., University of North Carolina), Raleigh, N. C.
Dutton, Emme Kwan (Ohio Wesleyan College), Kuala Lumpur, Malaysia
Grubb, James (B.D., Columbia Theological Seminary), Durham, N. C.
Harris, William Charles (B.D., Johnson C. Smith University), Martinsville, Va.
Randolph, Edna Earle (B.A., Blue Mountain College), Burlington, N. C.
Smith, Catherine Harris (A.B., Coker College), Saluda, S. C.
Snow, Charles William (A.B., M.A., Guilford College), Durham, N. C.
Noell, Eula Ann (B.A., Queens College), Durham, N. C.

## AUDITORS

Arnote, Thelma E. (M.A., George Peabody College), Raleigh, N. C.
Brabson, Joann Hawes (A.B., Mt. Holyoke College, M.A., Columbia University), Staunton, Va.
Bell, William Reed (B.A., Sewanee College), Pensacola, Fla.
Clarke, Coleman Daniel (A.B., Mercer University, Th.M., Southern Baptist Theological Seminary), Tokyo, Japan
Clarke, Jennie Elizabeth (B.S., University of Georgia), Tokyo, Japan
Johannson, Catherine B. (B.S., Iowa State College), Richland, Wash.
Shore, Ella Eugenia (A.B., William and Mary College), M.R.E., Duke University, M.A., University of North Carolina), Raleigh, N. C.

## CANDIDATES FOR THE MASTER OF THEOLOGY DEGREE

Bohannon, Kenneth Lewis (B.D., Vanderbilt University Divinity School), Northport, Ala.
Brown, Rodney Cain (B.S., University of California, B.D., Duke Divinity School), Sutter Creek, Calif.
Davis, Thomas Richard (A.B., Dartmouth College), Scranton, Pa.
Danek, Thomas Arnold (B.A., Southern Methodist University), Hillsboro, N. C.
DuBose, David (A.B., Wofford College, B.D., Duke Divinity School), Darlington, S. C.
Ellis, Charles Hoyt (A.B., Birmingham Southern College, B.D., Duke Divinity School), Birmingham, Ala.
Fukamachi Masanobu (A.B., B.D., Tokyo Union Theological Seminary in Japan), Shizuoka-shi, Japan
Gilbert, Douglass W. (A.B., Lambuth College, B.D., Duke Divinity School), Jackson, Tenn.
Goldston, Thomas Jennings, Jr. (B.D., Crozer Theological Seminary), South Boston, Va.
Hyatt, Robert P. (A.B., University of North Carolina), B.D., Yale University), Durham, N. C.
Jones, Ezra Earl (A.B., Birmingham-Southern College), Birmingham, Ala.
Lord, James Raymond (A.B., Presbyterian College; B.D. Princeton Seminary), Raleigh, N. C.
McFarland, George Max, Jr. (B.S., Virginia Polytechnic Institute, B.D., Duke Divinity School), Richmond, Va.
Manuel, Chrysostom (B.S. Theo., Greek Orthodox Seminary), Fayetteville, N. C.
May, Henry Elmon, Jr. (B.A., Moravian College, B.D., Moravian Theological Seminary), Winston-Salem, N. C.
Montfort, Russell (A.B., Davidson College, B.D., Duke Divinity School), Crestwood, Ky.
Patteson, Roy Kinneer, Jr. (B.A., University of Richmond, B.D., Union Theological Seminary), Pittsboro, N. C.
Patton, William R. (A.B., Duke University, B.D., Philadelphia Seminary), Charleston, S. C.
Perry, Frank Caston (A.B., Furman University), Chapel Hill, N. C.
Prevatt, James Thomas, Jr. (B.A., Emory University, B.D., Duke Divinity School), Monticello, Ga.
Smith, Franklin Pierce (A.B., Emory University, S.T.B., Boston University), Largo, Fla.
Spong, William Conwell (A.B., University of North Carolina), Durham, N. C.
Stines, James William (B.D., Southern Baptist Theological Seminary), Durham, N. C.
Thompson, Clark Alva (B.D., Harvard Divinity School), Winston-Salem, N. C.
Thompson, Leo Clifford (A.B., Duke University, B.D., Duke Divinity School), Durham, N. C.
Yamauchi, Ichiro (B.D., M.Th., Kwansei Gakuin University), Osaka, Japan
Yang, Hsin-Chang (B.D., Taiwan Theological College), Kao-hsiung, Taiwan, China

# *Enrollment Graduate Division of Religion 1963-64*

Arichea, Daniel C., Jr. (A.B., Philippine Christian Colleges; B.Th., Union Theological Seminary in the Philippines; M.R.E., Duke University Divinity School), San Narciso, Zambales, Philippines

Bassett, Paul M. (A.B., Olivet Nazarene College; B.D., Duke University Divinity School; M.S., Ohio State University), Chillicothe, Ohio

Bond, Hugh Lawrence (A.B., Lambuth College; B.D., Duke Divinity School), Memphis, Tenn.

Brown, Jesse H. (A.B., Elizabethtown College; B.D., Crozer Theological Seminary), Brownstown, Pa.

Burr, David D. (A.B., Oberlin College; B.D., Union Theological Seminary, NYC), Dalton, Mass.

Campbell, J. Gordon, Jr. (B.A., Vanderbilt University; B.D., McCormick Theological Seminary), Nashville, Tenn.

Carey, John J. (A.B., Duke University; B.D., Yale Divinity School), Tallahassee, Fla.

Crossley, Ronald C. (A.B., Howard College; B.D., Southern Baptist Theological Seminary), Anniston, Ala.

Eakin, Frank E., Jr. (B.A., University of Richmond; B.D., Southern Baptist Theological Seminary), Salem, Va.

Edwards, Carl N. (A.B., Duke University; B.D., Union Theological Seminary), Boonville, N. C.

Farrar, James A. (B.A. and B.D., Texas Christian University; S.T.M., Yale University Divinity School), Fort Worth, Tex.

High, Dallas M. (B.A. Ohio Wesleyan University; B.D., Yale Divinity School), Ohio City, Ohio

Huntley, William B. (A.B., Duke University; B.D., Yale Divinity School), Charlotte, N. C.

Jones, Donald L. (A.B., Ohio Wesleyan University; B.D., Methodist Theological School in Ohio), Delaware, Ohio

Kaylor, Robert David (A.B., Southwestern at Memphis; B.D., Louisville Presbyterian Seminary), Montevallo, Ala.

Knaus, Richard J. (B.A., Capital University; B.D., Evangelical Lutheran Seminary), Sandusky, Ohio

Lewis, G. Douglass (B.S., University of Tennessee; B.D., Vanderbilt Divinity School), Lexington, Tenn.

Locke, John W. (B.A., University of Toronto; B.D., The College of the Bible, Lexington, Kentucky), Ontario, Canada

McDaniel, William M. (A.B., Wofford College; B.D., Harvard Divinity School), Laurens, S. C.

Moretz, Walter J., Jr. (A.B., Lenoir-Rhyne College; B.D., Lutheran Theological Seminary), Camden, S. C.

Mount, C. Eric, Jr. (B.A., Southwestern at Memphis; B.D., Union Theological Seminary, Richmond; S.T.M., Yale Divinity School), Crossett, Ark.

Norment, Owen L., Jr. (A.B., University of North Carolina; B.D. and Th.M., Union Theological Seminary), Cameron, N. C.

Nuckols, Thomas W. (B.A., Tulane University; B.D., Southern Baptist Theological Seminary), Burleson, Tex.

Head, Marilyn Constance (A.A., San Antonio Junior College; B.A., M.A., Trinity University; B.D., Duke Divinity School), Durham, N. C.

Pelt, Michael R. (A.A., Chipola Junior College; B.A., Troy State Teachers College; B.D., Duke Divinity School), Mount Olive, N. C.

Petersen, Richard H. (A.B., Dartmouth College; B.D., Duke Divinity School), Cedar Grove, N. C.

Piper, John F., Jr. (A.B., Lafayette College; B.D., Yale Divinity School), Wynnewood, Pa.

Reuben, Odell R. (A.B., Benedict College; B.D., Benedict College; S.T.M., Oberlin College), Sumter, S. C.

Rice, Charles L. (B.A., Baylor University; B.D., Baptist Theological Seminary, Louisville, Ky.; S.T.M. Union Theological Seminary, NYC), Costa Mesa, Calif.

Rogers, Charles A. (B.A., Southwestern University; B.D. and S.T.M., Perkins School of Theology), San Antonio, Tex.

Setzer, J. Schoneberg (A.B., St. Olaf Lutheran College; B.D., Southern Lutheran Seminary), Salisbury, N. C.

Stassen, Glen H. (A.B., University of Virginia; B.D., Union Theological Seminary), New York, N. Y.

Tatum, W. Barnes (B.A., Birmingham Southern College; B.D., Duke Divinity School), Mobile, Ala.

Walser, Joseph G. (A.B., University of North Carolina; B.D., Union Theological Seminary), High Point, N. C.

Webster, Charles A., Jr. (A.B., Duke Divinity School; B.D., Southern Baptist Theological Seminary, Wake Forest), Clemson, S. C.

Wellborn, Charles T. (B.A., Baylor University; B.D., Southwestern Baptist Theological Seminary; M.A., Baylor University), Waco, Tex.

Wilson, Gerald L. (A.B., Davidson College; B.D., Duke Divinity School), Winston-Salem, N. C.

Zinn, Grover A. (B.A., Rice Institute, Houston, Texas; B.D., Duke Divinity School), El Dorado, Ark.

# *Summer Session 1963*

(WITHOUT DUPLICATION)

Brabham, John Risher (A.B., Wofford College), Bennettsville, S. C.

Burns, Grant Junior (A.B., Elon College), Randleman, N. C.

Faggart, Tommy Martin (A.B., Pfeiffer College), Kannapolis, N. C.

Holmes, David Lynn, Jr. (A.B., Michigan State University, Pittsburgh Theological Seminary), Detroit, Mich.

Hudson, Clayton Nolan (A.B., Birmingham-Southern College), Birmingham, Ala.

Kojima, Akihiro (B.E., Aoyama Gakuin University), Tokyo, Japan

Ritchie, Baxter Maurice (A.B., Davidson College), Concord, N. C.

Willingham, James David (B.S., Purdue University), Speed, Ind.

# *Enrollment Summary*

Divinity School Students, academic year 1963-64, 307; Summer Session (without duplication), 8; Graduate School Students, academic year 1963-64, 38; Total: 353.

## INSTITUTIONS REPRESENTED

Duke University, 43; Wofford College, 22; University of North Carolina, 17; High Point College, 14; Randolph-Macon College, 14; Pfeiffer College, 13.

The following 8 each: Birmingham-Southern College, Emory and Henry College.

The following 7 each: Millsaps College, Wake Forest College, West Virginia Wesleyan College, Yale University.

The following 6 each: Lenoir Rhyne College.

The following 5 each: Ohio Wesleyan University, Oklahoma City University, Southern Baptist Theological Seminary, Union College.

The following 4 each: Elon College, Greensboro College, Southwestern at Memphis College, University of Florida, Union Theological Seminary, New York.

The following 3 each: Baylor University, Coker College, Emory University, Guilford College, Hendrix College, Lambuth College, Mount Union College, North Carolina State College, University of Richmond, Vanderbilt University, West Virginia University, Western Maryland College, Union Theological Seminary, Richmond.

The following 2 each: Atlantic Christian College, Benedict College, Boston University, College of Charleston, Crozer Theological Seminary, Dartmouth College, Florida Southern College, Florida State University, Furman University, Harvard Divinity School, Howard College, Kentucky Wesleyan College, Marshall University, McMurry College, Morris Harvey College, North Carolina College, Oberlin College, Pembroke State College, Philippine Christian Colleges, Princeton University, Queens College, Scarritt College, Southern Methodist University, Texas Christian University, University of Chattanooga, University of Tennessee, University of Virginia, Union Theological Seminary (Philippines), Wesleyan University.

The following 1 each: Adrian College, Agnes Scott College, Aoyama Gakuin University, Appalachian State College, Baldwin-Wallace College, Baptist Theological Seminary (Louisville), Baptist Theological Seminary (Wake Forest), Beloit College, Blue Mountain College, Bucknell University, Capital University, Centenary College of Louisiana, Chipola Junior College, The Citadel, The College of the Bible, Columbia College, Columbia Theological Seminary, Columbia University, DePauw University, Dickinson College, Drew University, East Carolina College, Elizabethtown College, Erskine College, Evanston Lutheran Seminary, Evansville College, Fairmont State College, Florida A. & M. University; George Peabody College, Georgia State College, Grand Canyon College, Greek Orthodox Seminary, Illinois Wesleyan University, Iowa State College, Johnson C. Smith University, Kent State University, Kwansei Gakuin University, Lafayette College, LaGrange College, Livingstone College, Louisville Presbyterian Seminary, Lutheran Theological Seminary, Lycoming College, McCormick Theological Seminary, Marion College, Mercer University, Methodist Theological School in Ohio, Michigan State University, Mississippi College, Mississippi Southern College, Mississippi State University, Moravian College, Moravian Theological Seminary, Morningside College, Mt. Holyoke College, Muskingum College, New Mexico State University, Ohio State University, Olaf Lutheran College, Olivet Nazarene College, Perkins School of Theology, Philadelphia Theological Seminary, Pittsburgh Theological Seminary, Presbyterian College, Princeton Theological Seminary, Purdue University, Rice Institute, Richmond

Professional Institute, Sewanee College, San Antonio Junior College, Shaw University, Shepherd College, Southern Lutheran Seminary, Southeastern University, Southwestern Baptist Theological Seminary, Southwestern University, St. Andrews College, Stetson University, Taiwan Theological College, Trinity University, Troy State Teachers College, Tulane University, Union Theological Seminary in Japan, University of Alabama, University of California, University of Georgia, University of Illinois, University of Miami, University of Missouri, University of Oklahoma, University of Pennsylvania, University of Southern Mississippi, University of Tulsa, University of Toronto, Virginia Polytechnic Institute, Western Carolina College, Wilkes College, William and Mary College, Williams College, Wittenberg College, Youngstown University.

## DENOMINATIONS REPRESENTED

| | *Divinity* | *Graduate* | *Total* |
|---|---|---|---|
| Methodist | 252 | 14 | 266 |
| Baptist | 24 | 10 | 34 |
| United Church of Christ | 13 | 2 | 15 |
| Presbyterian | 8 | 6 | 14 |
| Lutheran | 5 | 3 | 8 |
| Episcopal | 5 | | 5 |
| Congregational Christian | 2 | | 2 |
| Disciples of Christ | | 2 | 2 |
| Moravian | 2 | | 2 |
| Church of God | 1 | | 1 |
| Dutch Reformed | 1 | | 1 |
| Greek Orthodox | 1 | | 1 |
| Nazarene | | 1 | 1 |
| Society of Friends | 1 | | 1 |
| Totals | 315 | 38 | 353 |

Number of Denominations Represented: 14.

## GEOGRAPHICAL DISTRIBUTION

North Carolina, 121; South Carolina, 31; Virginia 31; Florida, 18; Alabama, 13; Tennessee, 13; Ohio, 12; West Virginia 11; Pennsylvania, 10; Mississippi, 9; Georgia, 8; Illinois, 6; Oklahoma, 6; Kentucky, 5; New York, 5; Texas, 5; Arkansas, 4; Maryland, 4; New Jersey, 4; New Mexico, 4; Massachusetts, 3; California, 2; Louisiana, 2; Michigan, 2; Colorado, 1; Delaware, 1; Indiana, 1; Iowa, 1; Montana, 1; Vermont, 1; Washington, 1; Washington, D.C., 1; Wisconsin, 1; Japan, 6; Malaysia, 3; Philippines, 2; Canada, 1; China, 1; Dominican Republic, 1; Korea, 1.

STATES: 33.

FOREIGN COUNTRIES: 7

# BULLETIN OF DUKE UNIVERSITY

# The School of Medicine

ANNOUNCEMENTS FOR 1964-65

VOLUME 36 May, 1964 NUMBER 7-A

# Annual Bulletins

For Bulletin of Information for Prospective Students, apply to *The Registrar,* Duke University, Durham, N. C.—27706

For Bulletin of Undergraduate Instruction, apply to *The Registrar,* Duke University, Durham, N C.—27706

For Bulletin of Engineering, apply to *The Registrar,* Duke University, Durham, N. C.—27706

For Bulletin of The Divinity School, apply to *The Dean of Divinity School,* Duke University, Durham, N. C.—27706

For Bulletin of The School of Forestry, apply to *The Dean of the School of Forestry,* Duke University, Durham, N. C.—27706

For Bulletin of The Graduate School of Arts and Sciences, apply to *The Dean of the Graduate School,* Duke University, Durham, N. C.—27706

For Bulletin of The School of Law, apply to *The Dean of the School of Law,* Duke University, Durham, N. C.—27706

For Bulletin of The School of Medicine, apply to *The Dean of the School of Medicine,* Duke University, Durham, N. C.—27706

For Bulletin of The School of Nursing, apply to *The Dean of the School of Nursing,* Duke University, Durham, N. C.—27706

For Bulletin of The Summer Session, apply to *The Director of the Summer Session,* Duke University, Durham, N. C.—27706

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# BULLETIN
OF
# DUKE UNIVERSITY

## THE SCHOOL OF MEDICINE
AND
## DUKE UNIVERSITY MEDICAL CENTER




ANNOUNCEMENTS FOR 1964-65

DURHAM, NORTH CAROLINA
1964

# Foreword

This bulletin is issued for prospective medical students. Admission into any class is made only on the understanding that every decision of the Committee on Health Affairs shall apply to all students, even though it is made subsequently to their enrollment in the School. At frequent intervals the Committee on Health Affairs reviews the records of all students, and those whose progress has been unsatisfactory may be required to leave the School. Only those will be advanced who, in the opinion of the Committee on Health Affairs, give promise of being a credit to themselves and to the School. The next first-year class will be admitted September 8, 1964. For admission requirements and applications, see page 7.



The School of Medicine

# Officers of Administration

## *General Administration*

| | |
|---|---|
| Douglas Maitland Knight, Ph.D., LL.D., Litt.D.<br>*President of the University* | 2138 Campus Drive |
| Robert Taylor Cole, Ph.D.<br>*Provost* | 7 Sylvan Road |
| Gerhard Chester Henricksen, M.A., C.P.A.<br>*Vice President for Business and Finance*<br>*Treasurer* | 216 Forest Wood Drive |
| Everett Harold Hopkins, M.A., LL.D.<br>*Vice President for Planning and Institutional Studies*<br>*Assistant Provost* | 2016 Myrtle Drive |
| Frank Leon Ashmore, A.B.<br>*Vice President for Institutional Planning* | 2127 Campus Drive |
| Charles Edward Jordan, A.B., LL.D.<br>*Vice President for University Relations* | 615 West Campus Drive |
| Herbert James Herring, M.A., LL.D.<br>*Vice President for Student Life* | 2010 Myrtle Drive |
| Frank Traver deVyver, Ph.D.<br>*Vice Provost* | 8 Sylvan Road |
| Marcus Edwin Hobbs, Ph.D.<br>*Vice Provost* | 115 Pinecrest Road |
| Barnes Woodhall, M.D.<br>*Vice Provost* | 4006 Dover Road, Hope Valley |
| Benjamin Edward Powell, Ph.D.<br>*Librarian* | 3609 Hathaway Road, Hope Valley |
| Richard Lovejoy Tuthill, Ed.D.<br>*University Registrar* | 2709 Dogwood Road |
| Craufurd David Goodwin, Ph.D.<br>*Secretary* | 2705 Vineyard Street |
| Edwin Constant Bryson, LL.B.<br>*University Counsel* | 818 Anderson Street |

## *Duke University Medical Center*

Barnes Woodhall, M.D., *Dean, School of Medicine.*
William G. Anlyan, M.D., *Associate Dean, School of Medicine.*
Joseph E. Markee, Ph.D., *Assistant Dean in Charge of Admissions.*
William M. Nicholson, M.D., *Assistant Dean in Charge of Postgraduate Education.*
Richard A. Bindewald, A.B., *Assistant to the Dean, School of Medicine.*
Ann M. Jacobansky, M.A., *Dean, School of Nursing.*
Charles H. Frenzel, A.B., *Superintendent of Duke Hospital.*

## *Committee on Health Affairs*

Barnes Woodhall, *Professor of Neurosurgery, Dean of the School of Medicine and Chairman of the Committee on Health Affairs.*

Ann M. Jacobansky, *Professor of Nursing, Dean of the School of Nursing.*

William G. Anlyan, M.D., *Professor of Surgery, Associate Dean of the School of Medicine.*

Charles H. Frenzel, *Professor of Hospital Administration and Superintendent of Duke Hospital.*

Richard A. Bindewald, *Assistant to the Dean of the School of Medicine.*

Edith Perryman Brocker, *Associate Professor of Nursing, Assistant Dean of the School of Nursing.*

E. W. Busse, *Professor of Psychiatry.*

F. Bayard Carter, *Professor of Obstetrics and Gynecology.*

Lelia R. Clark, *Director of Nursing Service.*

Norman F. Conant, *James B. Duke Professor of Microbiology.*

Clarence E. Gardner, Jr., *Professor of Surgery.*

F. G. Hall, *Professor of Physiology and Pharmacology.*

Philip Handler, *James B. Duke Professor of Biochemistry.*

Jerome S. Harris, *Professor of Pediatrics.*

Thomas D. Kinney, *Professor of Pathology.*

J. E. Markee, *James B. Duke Professor of Anatomy and Assistant Dean in Charge of Admissions of the School of Medicine.*

Capitola B. Mattingly, *Associate Professor of Nursing, Director of Graduate Studies.*

William M. Nicholson, *Professor of Medicine and Assistant Dean in Charge of Postgraduate Education.*

R. J. Reeves, *Professor of Radiology.*

James H. Semans, *Professor of Urology.*

D. T. Smith, *James B. Duke Professor of Bacteriology and Associate Professor of Medicine.*

E. A. Stead, Jr., *Florence McAlister Professor of Medicine.*

Louis E. Swanson, *Assistant Superintendent and Associate Professor of Hospital Administration.*

Daniel C. Tosteson, *Professor of Physiology and Pharmacology.*

Four other members of the faculty holding the rank of Assistant Professor or above, by alphabetical rotation.

## *Medical School Advisory Committee*

William G. Anlyan, M.D., *Associate Dean of the School of Medicine and Chairman of the Medical School Advisory Committee.*

Barnes Woodhall, M.D., *Ex Officio, Dean of the School of Medicine and Vice Provost.*

Other Members: The heads of all departments in the Medical Center.

# 1964

### JANUARY

| S | M | T | W | T | F | S |
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### APRIL

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### JULY

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### OCTOBER

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### FEBRUARY

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### MAY

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### AUGUST

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### NOVEMBER

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### MARCH

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### JUNE

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# 1965

### JANUARY

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### JULY

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### OCTOBER

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| 31 | | | | | | |

### FEBRUARY

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| 30 | 31 | | | | | |

### AUGUST

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| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

### NOVEMBER

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

### MARCH

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### JUNE

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### SEPTEMBER

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| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

### DECEMBER

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| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

# Medical School Calendar

## *1964-65*

1964

| | | |
|---|---|---|
| June | 29 | Registration and first day of Summer Session. |
| July | 4 | Independence Day holiday. |
| August | 29 | End of Summer Session. |
| September | 8 | Registration and first day of first term. |
| November | 7 | End of first term. |
| November | 9 | Begin second term. |
| November | 26 | Thanksgiving Day holiday. |
| December noon | 19 | Begin Christmas holiday. |

1965

| | | |
|---|---|---|
| January | 4 | Classes resume. |
| January | 23 | End of second term. |
| January | 25 | Begin third term. |
| March | 27 | End of third term. |
| March April | 28-3 | Spring vacation for third and fourth year students. |
| March | 29 | Begin fourth term for first and second year students. |
| April | 5 | Begin fourth term for third and fourth year students. |
| April | 11-17 | Vacation for first and second year students. |
| June | 5 | End of fourth term. |
| June | 7 | Commencement exercises. |
| June | 28 | Registration and first day of Summer Session. |
| July | 4 | Independence Day holiday. |
| August | 28 | End of Summer Session. |
| September | 7 | Registration and first day of first term. |
| November | 6 | End of first term. |
| November | 8 | Begin second term. |
| November | 25 | Thanksgiving Day holiday. |
| December noon | 18 | Begin Christmas holiday. |

# Admission

*I request that great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination and application evincing a wholesome and real ambition for life."*—James B. Duke.

Intelligence, character and integrity are the essential qualifications for admission.

A premedical student should be aware of the importance of a well-rounded general education as a preparation for the study of medicine and not limit himself to scientific courses. The Admissions Committee believes that the manner in which the college load is carried is of greater importance than the specific subjects taken. The premedical student would be better advised to secure a knowledge of the principles and a thorough appreciation of the interrelations of the basic sciences than to accumulate credits in many courses. He should learn how to work independently, to observe critically and to analyze rather than merely to store the information presented. Good study habits and use of time are perhaps the most important tools a student can bring to the study of medicine. His choice of studies beyond those required for admission should be governed by his own chief interests and by the intellectual stimulus to be derived from the work. In general he should avoid courses in subjects which are included in the medical curriculum.

## *Application for Admission*

Application forms may be obtained by writing to the Secretary of Admissions, Box 3710, Duke Hospital, Durham, N. C. Please do not send a request before August 1. Formal applications will be accepted by the Committee on Admissions only between 1 August and 1 December.

Due to the large number of qualified applicants to all medical schools, each student is urged to apply to at least four schools. In the event an applicant is accepted by another school before he has heard from Duke, and is forced to secure that acceptance with a deposit, he may request an earlier consideration by our Committee.

## *Requirements for Admission*

1. A minimum of ninety semester hours of approved college credit is necessary for admission to the School. It must include:

A. Two years of English. The second year should be chiefly expository English composition.
B. Two years of chemistry. The first year should be inorganic and the second analytic and organic.
C. One year of physics.
D. One year of biology and/or zoology.
E. One year of mathematics.

Strongly recommended courses but not absolutely required:

F. Embryology.
G. Calculus.
H. Genetics.

All science requirements must be completed not more than seven years prior to entrance.

2. Medical College Admission Test. This test is required of all applicants. It is administered by the Psychological Corporation, 304 E. 45th St., New York 17, New York. This test is given at many of the colleges throughout the country in May and October of each year. Arrangements for taking this test should be made by the student through his premedical advisor.

## *Selection*

Selection is made between September 15 and February 15 for the students entering the following September. The data on each candidate are carefully screened by the Committee on Admissions. A personal interview will be arranged for those with satisfactory credentials. If the distance from Durham is permissible the interview is conducted here; otherwise the candidates are referred to our regional representatives. Many factors are evaluated by the Committee in the selection process. Those students who show the most promise for exceptional future practice of medicine are admitted. The candidate is notified as soon as possible whether or not he has been accepted. If he has been accepted it is necessary to send a deposit of $50.00 by the succeeding January 15 in order to insure enrollment. This deposit is applied toward tuition. Inasmuch as admission must be offered a considerable period in advance of matriculation the admission must be provisional upon the successful completion of the remaining college work. In addition, a physcial examination is necessary prior to enrollment.

TRANSCRIPTS. A student who wishes to transfer his credits to another institution should direct his request to the Recorder, Duke University School of Medicine. Transcripts are furnished without charge.

## *Advanced Standing*

Applications for transfer into the second and third year classes will be considered only if space permits. No application for entrance to the fourth year will be considered. For entrance into the third year, Part I of the National Board Examination will be required as evidence of satisfactory accomplishment in the subjects of the first two years.

A limited number of transfer students from foreign medical schools may be admitted each year. Such students will be admitted into the third-year class in January only. During two nine-week terms, from January to June, these transfer students will divide their time between: 1) Clinical Microscopy, Physical Diagnosis and Psychiatry, and 2) a nine-week elective term. A faculty committee will plan the elective program for each student on the basis of his needs and interests. By attending two summer sessions, a transfer from a foreign medical school can receive his M.D. degree from Duke University approximately two and one-half years after matriculation.

## *Regional Representatives of the Committee on Admissions*

*Alabama*
Birmingham ..... Sam E. Upchurch

*Arizona*
Phoenix ..... Stanley Karansky

*Arkansas*
Little Rock ..... Rosalind Smith Abernathy

*California*
Berkeley ..... H. I. Harvey
Los Angeles ..... Joseph A. Conroy
Los Angeles ..... Jeremiah W. Kerner
Menlo Park ..... Gustave Freeman
Palo Alto ..... James B. Golden
Pasadena ..... Robert H. Pudenz
San Francisco ..... John E. Cann
San Mateo ..... Lester H. Margolis

*Canada*
Montreal ..... J. E. Gibbons
Toronto ..... John B. Armstrong

*Colorado*
Denver ..... F. Vernon Altvater

*Connecticut*
- Hartford — WILLIAM H. GLASS
- New Haven — CLARENCE DAVIS
- New Haven — SAUL A. FRANKEL
- New Haven — JOSEPH MIGNONE
- New Haven — NED M. SHUTKIN
- Old Saybrook — JOHN R. EGAN

*District of Columbia* — LOUIS SPEKTER

*Florida*
- Gainesville — LAMAR ROBERTS
- Lakeland — CHARLES LARSEN, JR.
- Miami — JAMES J. HUTSON
- St. Petersburg — DAVID S. HUBBELL
- Tampa — RICHARD G. CONNAR

*Georgia*
- Atlanta — E. B. DUNLAP, JR.

*Hawaii*
- Honolulu — JAMES G. HARRISON, JR.

*Idaho*
- Boise — WILLIAM L. VENNING
- Idaho Falls — REID H. ANDERSON

*Illinois*
- Chicago — GEORGE H. GARDNER
- Chicago — DANIEL J. PACHMAN
- Chicago — E. CLINTON TEXTER, JR.
- Evanston — DONALD R. MUNDIE
- Evanston — KENNETH S. SHEPARD
- Evanston — MILTON WEINBERG, JR.
- Monmouth — KENNETH E. AMBROSE

*Indiana*
- Indianapolis — STUART O. BONDURANT

*Iowa*
- Iowa City — ARTHUR L. BENTON

*Kansas*
- Kansas City — RALPH H. MAJOR
- Wichita — THOMAS JAGER

*Kentucky*
- Lexington — KEARNS R. THOMPSON
- Louisville — GEORGE UHDE

*Louisiana*
- New Orleans — RICHARD H. CORALES, JR.
- New Orleans — HAROLD H. HORACK
- New Orleans — PHILIP H. JONES
- New Orleans — RICHARD M. PADDISON

*Maine*
- Portland — E. CHARLES KUNKLE

*Maryland*
- Baltimore — JOHN T. KING
- Baltimore — C. EDWARD LEACH

*Massachusetts*
Boston ..... JAMES H. CURRENS
Boston ..... DOROTHY A. ELIAS
Boston ..... ELLISON C. PIERCE, JR.
Boston ..... R. LEWIS WRIGHT
Brookline ..... JAMES L. TULLIS
Milton ..... RAYMOND D. ADAMS
Springfield ..... GEORGE A. SOTIRION

*Michigan*
Ann Arbor ..... MURIEL MEYERS
Port Huron ..... WILLIAM T. DAVISON

*Minnesota*
Rochester ..... W. HENRY HOLLINSHEAD

*Missouri*
Kansas City ..... ROBERT H. BARNES

*New Hampshire*
Hanover ..... GEORGE MARGOLIS
Hanover ..... ROBERT J. VANDERLINE

*New Jersey*
Montclair ..... BENJAMIN B. BURRILL

*New Mexico*
Albuquerque ..... ROBERT PROPER
Artesia ..... C. PARDUE BUNCH

*New York*
Endicott ..... JAMES K. TOMPKINS
New York City ..... EUGENE L. HORGER
New York City ..... JULIA M. JONES
New York City ..... MICHAEL J. LEPORE
New York City ..... J. WILLIAM LITTLER
New York City ..... RICHARD A. RUSKIN
New York City ..... JOSEPH A. C. WADSWORTH
Rochester ..... ASHTON B. MORRISON

*Ohio*
Cleveland ..... GEORGE M. STROUD
Columbus ..... ROBERT J. ATWELL
Columbus ..... CHARLES A. DOAN
Columbus ..... JAMES V. WARREN
Dayton ..... STUART R. DUCKER
Toledo ..... JOHN L. STIFEL

*Oklahoma*
Tulsa ..... GERALD E. CRONK

*Oregon*
Portland ..... RICHARD R. CARTER

*Pennsylvania*
Bethlehem ..... RALPH K. SHIELDS
Bethlehem ..... JAMES G. WHILDIN
Bryn Mawr ..... JOHN V. BLADY
Johnstown ..... W. FREDERICK MAYER
Philadelphia ..... MAX W. FISCHBACH
Philadelphia ..... KARL C. JONAS
Philadelphia ..... ALFRED M. SELLERS
Pittsburgh ..... JACK D. MYERS

*Puerto Rico*
Santurce.....KENNETH B. BROWN

*Rhode Island*
Providence.....MARSHALL N. FULTON

*South Carolina*
Charleston.....EDWARD F. PARKER
Charleston.....J. I. WARING
Columbia.....BEN N. MILLER
Greenville.....RAYMOND C. RAMAGE

*Tennessee*
Chattanooga.....RICHARD VAN FLETCHER
Memphis.....RAPHAEL E. SEMMES
Nashville.....A. GREER RICKETSON
Sewanee.....HENRY T. KIRBY-SMITH

*Texas*
Dallas.....A. JAMES GILL
Galveston.....HENRY L. BURKS
Galveston.....R. H. RIGDON
Houston.....H. GRANT TAYLOR
Midland.....DOROTHY B. WYVELL
San Antonio.....ROYALL M. CALDER

*Utah*
Salt Lake City.....THOMAS RAY BROADBENT

*Vermont*
Burlington.....RUFUS C. MORROW

*Virginia*
Charlottesville.....HENRY B. MULHOLLAND

*Washington*
Seattle.....W. A. MACCOLL

*West Virginia*
Charleston.....HAROLD H. KUHN
Huntington.....GEORGE M. LYON

*Wisconsin*
Madison.....O. A. MORTENSEN

## GENERAL INFORMATION FOR APPLICANTS

| | |
|---|---|
| Years of college work required for entrance | 3 |
| Resident and Non-resident tuition and fees for first year | $1412 |
| Estimated cost of equipment (books, supplies, etc.) first year | $265 |
| Estimated minimum cost of room and board for first year | $860 |
| Amount of non-refundable application fee | $10 |
| May give early decision to applicant preferring this school but offered a place in another school | Yes |
| Medical College Admission Test required | Yes |

### 1964-65 FIRST YEAR CLASS

| | |
|---|---|
| Size of first year class | 80 |
| File application for admission between | Aug. 1, 1964<br>Dec. 1, 1964 |
| Applicant will be notified of action on his application between | Oct. 1, 1964<br>Feb. 15, 1965 |
| Amount of deposit fee required on or after January 15, 1965, to hold place in class if applicant is accepted Deposit refundable before January 15 | $50.00 |
| Date entering class starts program | Sept. 7, 1965 |

Address inquiries to:
Secretary of Admissions
Box 3710
Duke Hospital
Durham, N. C.

# Financial Information

## *Fees and Expenses*

Listed below is a table of the approximate expenses for the normal four term academic year of the School of Medicine:

| | |
|---|---|
| Tuition and fees | $1412.00 |
| Board | 600.00 |
| Room | 260.00 |
| Books | 135.00 |
| Laundry | 100.00 |
| Insurance, instruments and incidentals* | 160.00 |
| | $2667.00 |

One fourth of the total fees is payable by the Friday preceding each nine-week term. A fine of $5.00 is charged for late registration after this time. No credit will be given for any term in which the tuition has not been paid, whether the work has been done here or elsewhere.

It is not advisable for students to attempt outside work to defray their expenses during the academic year. The curriculum is so crowded that the results usually are disastrous to the student's health and academic standing.

## *Availability of Financial Assistance for Medical Education*

With the increasing cost of medical education, the need has also increased for financial assistance to deserving students. Three kinds of aid are currently available: scholarships or fellowships; loans; and cash awards.

## *Scholarships or Fellowships*

a. THE CHARLES ALVA STRICKLAND MEMORIAL FUND SCHOLARSHIPS may cover up to full tuition costs. This scholarship may be renewed for each of the years after the first year. Merit and need are taken into consideration.

* Microscope, sphygmomanometer, ophthalmoscope, otoscope, and other equipment, which are required of each student and which must conform to rigid standards, may be obtained on a rental basis from the University.

b. THE DR. HILLORY M. WILDER SCHOLARSHIP FUND covers full tuition for each of four years and is awarded on the basis of merit and need.

c. THE DUKE MEDICAL SCHOOL ALUMNI SCHOLARSHIPS are awarded to outstanding students, irrespective of financial need. These honorary scholarships carry an annual stipend of $500.00 per year for each of four years.

d. THE PFIZER Scholarship, offered by Pfizer Laboratories, a Division of Charles Pfizer & Co. Inc., is an award of $1000 granted to a student selected on the basis of merit and need.

e. THE MANOOCHERIAN-ROBBINS FOUNDATION SCHOLARSHIP of $500.00 for one year is granted to one outstanding student each year. This award is made as a supplement to a student who has already been awarded some other scholarship aid.

f. STUDENT RESEARCH FELLOWSHIPS are available as part of an extensive program, designed to encourage the medical student to participate in research. Summer Fellowships carry a stipend of $200.00 per month. These Fellowships enable a student, after completion of his first year, to participate in research during a summer vacation or other free time. Special Fellowships in Nutrition, Ophthalmology, Allergy and other fields are also available. Opportunities also exist for a student to engage in research for an entire year during which time he temporarily discontinues his medical course. These Post-Sophomore Research Fellowships carry a stipend of $3200 per year plus an allowance for dependents and tuition expenses. In special circumstances these Fellowships are tenable at institutions other than Duke Medical Center and outside the United States. Information may be obtained from Dr. E. Croft Long, Box 3195, Duke University Medical Center.

g. THE WILBURT C. DAVISON SCHOLARSHIP was instituted to enable a medical student to widen his experience by clinical study outside of the United States. One award of $500.00 is made each year. Information may be obtained from Dr. E. Croft Long, Box 3195, Duke University Medical Center.

## *Loans*

a. THE ANGIER B. DUKE MEMORIAL LOAN FUND covers amounts up to full tuition for each of four years.

b. THE W. K. KELLOGG FOUNDATION FUNDS are available for amounts up to full tuition for each of four years.

c. THE FRANCIS AND ELIZABETH SWETT FUNDS are immediately available to students with emergency need. These loans are usually small, on a short-term basis.

Loan funds are administered in accordance with the following regulations:

1. No loan will be made to a student who violates any of the regulations of the University or who is not doing outstanding classwork.

2. Loans will be made only to students who are taking full courses of study that lead to a degree. All loans except the Swett Fund must be arranged not later than July 1 of each year.

3. Every applicant for a loan must present with the application such security as the President of the University may approve, and no money will be advanced before a note with approved security is in the hands of the Treasurer of the University.

d. NORTH CAROLINA STATE LOANS are available to worthy students who agree to practice in a North Carolina rural area or small town of less than 2500 population for at least four years after the completion of their professional training. To be eligible a student must have been a resident of North Carolina for the past eight years. The maximum loan to a medical student is $1,400.00 per academic year ($5,600.00 for a four year period). The student who receives a loan must, immediately following completion of the four year medical course, take a rotating internship of one year and if approved by the Medical Care Commission, he will have the option of continuing the internship through a second year. Detailed information can be obtained from the North Carolina Medical Care Commission, Post Office Box 1880, Raleigh, North Carolina.

## *Cash Awards*

THE BORDEN UNDERGRADUATE RESEARCH AWARD IN MEDICINE is an award of $500.00 to be given to the Duke senior who, in the opinion of the Committee on Health Affairs, has performed the best research work during his or her entire medical course, including that done during the preclinical years. Applicants should submit their papers, articles or reprints to the Dean at least three months prior to expected date of graduation.

THE TRENT PRIZE IN THE HISTORY OF MEDICINE is an annual award of fifty dollars for the best original and publishable essay on any topic in the history of medicine or its allied sciences by a Duke medical student or house-officer. It was established by Mrs. Mary Trent Semans in memory of the late Dr. Josiah C. Trent, who was Assistant Professor of Surgery in charge of Thoracic Surgery and who greatly increased the interest of the staff and students in medical history. Essays should be submitted to Dr. Joseph E. Markee, by April 1 of the year in which they are to be considered.

THE ROBERT U. YOUNG AWARD was established by friends and classmates of the late Robert U. Young (M.D. '51). An outstanding second year student, selected by the Dean, receives all of the basic equipment needed except for the microscope.

# Curriculum

The academic year consists of thirty-six weeks. For third and fourth-year students there will be four terms of nine weeks each. In the first two years the instructional program does not adhere rigidly to the above terms, but rather involves interdepartmental correlations. The third year is made up of nine-week terms of medicine, surgery, obstetrics-gynecology and psychiatry. The fourth year is comprised of nine-week terms of medicine, surgery and pediatrics and one term as an elective. Elective courses have been organized for small groups, or the time may be utilized in independent work (including research) in any department, clinical or preclinical. Arrangements for taking such courses or doing other work are made through the Curriculum Committee.

Students are encouraged to take a portion of their medical school work at other schools. Permission must be obtained in advance from the Committee on Health Affairs and the full tuition at Duke must be paid for that quarter. If the charges at the school at which the work is taken are less than those at Duke they will be paid by Duke and if more, the difference must be made up by the student. At the completion of the work in another school an examination in the subject may be conducted by the department at this medical school.

## *Promotion*

The records of each student in the first and second years are reviewed periodically by special Promotion Committees, which are made up of the preclinical Department Chairmen. The Committee on Health Affairs acts on recommendations from these Promotion Committees and may:

1. promote to the next year those students whose work is satisfactory.
2. warn those students whose work is below average that they must improve their scholastic endeavor.
3. place on probation those students whose work is very unsatisfactory.
4. request the resignation of any student who is considered an unpromising candidate for the degree of Doctor of Medicine.

A student wishing to appeal this decision may do so to the Chairman of the Committee on Health Affairs within two weeks of his notification.

The Committee on Health Affairs reserves the right to require the withdrawal of any student at any time if, in the opinion of the majority of its members, he should not continue his course.

At the end of the second year each student will be required to take Part I of the National Board Examinations.

## *Medical Research Training Program*

James B. Wyngaarden, M.D. (University of Michigan, 1948), *Professor of Medicine and Associate Professor of Biochemistry; Director, Research Training Program.*

Irwin Fridovich, Ph.D. (Duke University, 1955), *Assistant Professor of Biochemistry.*

Walter Guild, Ph.D. (Yale University, 1951), *Associate Professor of Biochemistry* (Biophysics).

Samson Gross, Ph.D. (Columbia University, 1953), *Associate Professor of Microbiology* (Genetics).

Kenneth McCarty, Ph.D. (Columbia University, 1958), *Associate Professor of Biochemistry.*

John Moore, Ph.D. (University of Virginia, 1945), *Associate Professor of Physiology.*

Montrose Moses, Ph.D. (Columbia University, 1949), *Associate Professor of Anatomy.*

Salih Wakil, Ph.D. (University of Washington, 1952), *Associate Professor of Biochemistry.*

The Medical Research Training Program is an elective program available to qualified students after completion of the first two years of the curriculum, and to members of the Duke Hospital resident staff, Postdoctoral Fellows in the clinical and preclinical departments and qualified graduate students.

The objective of the program is to provide a more sound basis for the future work of those hoping to devote their lives to a career in investigative medicine and biology. Approximately 8 medical students and 8 postdoctoral fellows are accepted annually. Applicants are admitted upon recommendation by a faculty committee on the basis of a past academic performance, evidence of research bent and curiosity, and motivation toward an academic research career.

The program offers an academic year (September to June) of full-time research training in medical sciences basic to clinical investigation, and emphasizes primarily "cell biology." It includes three types of activities: 1) Three months are devoted to an extensive series of laboratory experiences in cytology and fine structure, cell and tissue culture, biochemical studies of cell growth, bacterial and phage genetics, protein synthesis and its genetic determination, physical biochemistry of nucleic acid and of proteins including antibodies and enzymes, membrane functions, and organized cellular controls. These

three introductory months are designed to familiarize the student with concepts and experimental approaches in these fields, and with the use of important and complex tools and techniques not ordinarily taught in undergraduate courses. 2) Six months are devoted to a research problem conducted either in the general laboratory set apart for this program or in the laboratory of one of the faculty with whom the participant chooses to work. 3) Seven hours per week, throughout the year, are devoted to class work in mathematics, biostatistics and bioelectronics in courses expressly designed for students of this program, and one evening each week is devoted to seminar work. Special lectures are given by guests from the university faculty or from other institutions. The entire program is housed in a special wing of the W. B. Bell Medical Research Building, and is under the direction of members of the faculty who devote themselves largely to this training program.

The qualified medical student can participate in this program without delaying his graduation and without increasing the cost of his education. By using two summers of clinical studies, and by receiving elective credit for two of the four quarters in the training program, he enters his senior year abreast of his class. He receives a training stipend of $200 per month during the program. He ultimately pays the same tuition as any other medical student.

The Graduate School of Duke University will also accept the total of the first two years of medical school plus participation in this program as residence time toward the degree of Doctor of Philosophy. In addition, the individual student must satisfy the language and dissertation requirements of the Graduate School and any special requirements stipulated by the department in which he elects to obtain this degree. The combined degree program is arranged individually and requires a minimum of 5½ to 6 years.

It is suggested that medical students undertake this program at the completion of the first two years of the curriculum and then return to the normal clinical medical curriculum. Such students should also expect to undertake one or two years of a postdoctoral research fellowship in the course of their residency training in order to prepare themselves fully for an academic research career.

## *Undergraduate Cancer Training Program*

(Supported by a grant-in-aid from the USPHS)

*Coordinator:* Albert G. Smith, M.D.

The student is instructed in cancer problems by ward assignments, tumor clinics for the undergraduate student, and special lectures and courses given by various departments. During the third year, the student studies ward patients with a clinical instructor from the

departments of surgery, obstetrics and gynecology or pediatrics. The student participates in all phases of the care of patients with cancer (diagnosis, pre- and post-operative care, and assisting in the operation). He observes the lesion in situ, examines it in the fresh state, follows the specimen through the pathologic laboratory, and studies the prepared slides for microscopic appearance, thereby learning pathology techniques and checking on the accuracy of his own diagnosis. Interdepartmental tumor clinics offer combined teaching by the pathologist, radiologist, surgeon, gynecologist and pediatrician, and teach the student the techniques and value of each of these disciplines, as well as giving the student a comprehensive review of the special cancer problems. Special courses given by the radiology and pathology departments teach the use and value of diagnostic and therapeutic x-ray and diagnostic surgical pathology in handling the cancer patient.

The training program is supplemented by a tumor registry where accurate follow-up records are kept with the results summarized and made available to staff and students. Thus they can know the year by year results of treatment of large numbers of patients as expressed in percentages of those (1) free of recurrence, (2) apparently cured, (3) having a recurrence, or (4) dead of recurrence at varying times after onset of the disease and the institution of therapy.

# General Information

## *Introduction*

Duke University Medical Center was established in 1930, through the munificient gift of the late James B. Duke. The School of Medicine and Hospital are located in the same building complex situated on the campus of Duke University. Both have been planned to insure the greatest correlation between the various departments. The students in the School of Medicine are accorded the same privileges and are subject to the same laws and regulations as those of the other divisions in the University. Eighty students are admitted to the first year class each year and on September 3, 1963, three hundred and forty students were enrolled.

## *Aims of the School*

Duke University School of Medicine, from its beginning in 1930, has maintained as its major objectives: a) the cultivation and teaching of medicine on a strictly scientific basis; b) the correlation of medical research with medical teaching at all levels of its teaching; and c) the continuous search for an experimentaton with new or improved methods of teaching scientific medicine. From these basic objectives, the following implementation has been effected:

a. The standard curricula is designed to provide a strong academic basis for a lifelong growth within the profession of medicine and is intended to foster development of attitudes of skepticism and inquiry, of technical competence, and proficiency in the arts peculiar to the practice of medicine, as well as inculcate and appreciation of its broader social responsibility and potential role of service.

b. Elective opportunities are made available whenever possible, to permit early differentiation of students along lines of talents and interests, and to encourage early career decisions that will lead to wise investments of time and to scholarly efforts.

c. Among the special opportunities offered are those designed to provide model experiences in the practices of medicine, as well as those designed to attract qualified students into research and teaching.

d. The Medical School takes active measures to perpetuate its own disciplines. This includes development of strong pre- and post-doctoral training programs with sufficient flexibility to accommodate

students with widely divergent career goals. Such programs are based on scholarship to produce leaders for the profession, both in contribution of knowledge and in excellence of action.

In order to attain these objectives, the School has been organized, its physical plant planned, and its administrative structure constituted so that there exists the closest possible academic and physical relationship between undergraduate and graduate work in the University and the School of Medicine, and also between the basic medical sciences and the clinical sciences within the School and its integrated teaching Hospital.

The professional staff of the School is composed of two general categories; those with permanent appointment and unlimited tenure, and those with temporary appointment. The latter, the much larger group, is maintained on a highly fluid basis, which makes possible a high degree of selectivity in appointment for academic training and scientific research. The smaller group of permanent appointees has in every individual a background characterized by academic and scientific attainment. The professional, academic, and scientific environment created by the staff is thus such as to engender scientific inquiry and to encourage diligent pursuit of the medical sciences in all their relationships. The staff at all levels devotes its entire professional time to the activities of the Medical Center.

## *Degrees*

*Doctor of Medicine.* The degree of Doctor of Medicine is conferred on those who have completed the curriculum of the School of Medicine to the satisfaction of the Committee on Health Affairs. In addition, each candidate for this degree is required to sign an agreement that he will spend at least two years of the succeeding three years in hospital or laboratory work acceptable to the Committee on Health Affairs. This required period of approved hospital or laboratory work may be active duty in the Armed Forces or the U.S. Public Health Service. As a guarantee of this pledge the diploma is deposited in the Central Records office until the additional training is completed. A temporary certificate is issued at the time of graduation which must be returned prior to the delivery of the permanent diploma. Failure to fulfil this agreement constitutes a waiver of any claim to possession of the diploma and the degree of Doctor of Medicine.

*Bachelor of Science in Medicine.* The degree of Bachelor of Science in Medicine is conferred upon those students who have fulfilled the following requirements:

1. Satisfactorily completed eight terms in the Duke University School of Medicine.

2. Obtained approval of a research program by the head of the department in which the work is to be done.
3. Obtained written permission from the Committee on Health Affairs for the program.
4. Completed creditable investigative work, under the supervision of an Advisory Committee appointed by the Chairman of the appropriate department.
5. Completed a written report of the investigation which has been accepted by the Advisory Committee and submitted two bound copies and one unbound copy to the Dean at least two months prior to the expected date of graduation.
6. Passed an examination upon the subject of investigation before the Advisory Committee.

No credit toward this degree is given for additional college work. All students in good standing are encouraged to undertake work toward this degree, in addition to their work toward the degree of Doctor of Medicine.

*Master of Science and Doctor of Philosophy.* Work leading to each of these degrees may be pursued in the preclinical departments. For further details concerning conditions under which these degrees are awarded consult the Bulletin of the Graduate School of Arts and Sciences.

## *Facilities*

*Duke Hospital,* an integral part of the Medical Center, is a 650-bed, 30-bassinet general hospital which performs the concurrent functions of patient care and professional education. It admits over 20,000 patients a year, and maintains comprehensive diagnostic and treatment facilities for their care.

Different levels of patient care are provided by a minimal care unit and intensive care facilities in addition to conventional nursing units. Private, semi-private, and ward accommodations are available. Approximate daily patient census by service is as follows: Surgery (including Urology, Otolaryngology, Ophthalmology, and Orthopaedics), 250; Medicine (including Dermatology and Neurology), 160, Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include 18 operating rooms and a recovery room. Over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained.

Outpatient services include a public clinic which totals over 120,000 visits a year, a private diagnostic clinic of comparable size, and an active emergency service. All of the hospital components are located within a single interconnected building complex. Close working

relationships between Duke Hospital and outside health agencies contribute to continued care.

The clinical faculty of the Duke University School of Medicine, which is composed of 130 specialists, forms the medical staff of Duke Hospital. This group participates in both undergraduate and graduate medical education, and in active medical practices within the hospital and the private diagnostic clinic.

Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association, and conducts an active educational program involving approximately 300 house staff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

*Teaching and Research Facilities.* In addition to those carried on in Duke Hospital patient areas, classrooms, and laboratories, teaching and research activities are also carried on in the Davison (Medical School) Building, the Diagnostic and Treatment Building, the Gerontology Building, the Clinical Research Building, and the William B. Bell Research Building. Except for the Bell Building, each is a part of a single building complex.

*Veterans Hospital.* The Durham Veterans Administration Hospital is located within walking distance of the School of Medicine. This 485 bed general hospital was opened in April, 1953. Its fulltime professional staff are all members of the faculty of Duke University School of Medicine and the house staff training at the Veterans Hospital and Duke Hospital are closely integrated.

## *Library*

G. S. T. Cavanagh, B.A. (Manitoba, 1950), B.L.S. (McGill, 1951), *Director and Professor of Medical Literature, Curator of Trent Collection.*

Polly Gibbs Miller, A.B. (Meredith, 1950), *Assistant Librarian.*

Constance T. McDaniel, M.S. (Drexel Institute of Technology, 1952), *Chief Cataloguer.*

Dorothy Mueller, A.B. (Birmingham-Southern, 1959), M.A. (Peabody, 1961), *Reference Librarian.*

Ardie L. Kelly, B.A. (Lynchburg College, 1957), M.S.L.S. (University of N.C., 1963), *Assistant Curator of Trent Collection.*

The Medical Center Library attempts to provide all services and collections necessary to further educational, research and clinical activities in the medical field. Extensive reference and bibliographical service is provided. The collection exceeds 70,000 volumes and about 1300 current periodicals are being received, over one hundred of them in duplicate subscriptions.

The Trent Collection in the history of medicine is an unusually fine one, rich in manuscripts and rare books, and providing opportunity for study and research as well as casual reading in the field.

# *Medical Care*

Elbert L. Persons, A.B., M.D., *Physician-in-Charge and Professor of Medicine.*
Richard M. Portwood, A.B., M.D., *Assistant to the Director and Associate in Medicine.*

With the exceptions noted below, full medical and surgical care is furnished to all regularly matriculated medical students of the University who have paid the quarterly General Fee. This service is under the direction of the Physician-in-Charge with the co-operation of the staff of the Duke University Medical Center. It includes hospitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward but not special nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernia, elective surgery, chronic skin conditions, endocrine disturbances, etc., or accidents or illnesses occurring during vacations or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as of special nursing must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care.

# Central Television Facility

Sam A. Agnello, A.B. (Duke 1939), *Coordinator of Medical Television.*

The functions of this unit include television service directed toward the instruction, research, and patient care programs of the Medical Center. Another function is that of conducting continuing research in evaluation studies and in the development of television utilization.

The original television system was installed in November, 1960, in the Anatomy Department for experimentation in the utilization of television in teaching and research. Dr. J. E. Markee, *James B. Duke Professor of Anatomy and Chairman of the Department of Anatomy,* led the way for this experiment. Mr. S. A. Agnello and Dr. F. D. McFalls, *Assistant Professor of Anatomy,* assisted him. During the period following this time, television has been used as a communication medium in the following courses of study for medical students, house staff, nursing students, physical therapy students, and graduate students: gross anatomy, neuroanatomy, physiology, pathology, medicine, psychiatry, radiology, and in the medical career orientation lecture series. A collection of videotaped material is available as cores for teaching presentations. Research and patient care applications of television have been undertaken by the Department of Medicine (Cardiovascular Laboratory and Medical Outpatient Clinic) and are projected by the Psychiatry Department.

The television system is designed to enhance the multimedia approach for instruction. The television control center is capable of interdigitation of all audio and video signals originating from TV cameras, a motion picture-opaque-slide pick-up device, and videotape recorder. Mobile cameras, monitors (receivers), and the wide-screen TV projector may be used in 21 specific locations throughout the Medical Center. These locations include all major classrooms. With the use of extension cables, other locations may be reached. Four-channel capability is a built-in feature of the system.

Although no formalized study in educational television is provided, individual training programs are available for those who wish to pursue medical television as a career. Consultation and training programs are designed for those who wish to utilize television in their professional activities.

## *Living Accommodations*

The Men's Graduate Center is available to men enrolled in the Medical School. The rooms are equipped for two persons and the

rental charge for a double room is $520.00 for the academic year (4 terms) or $260.00 for each occupant, or $65.00 each occupant per term.

Epworth Hall on the Woman's College Campus and Hanes House on the Duke University Campus are available to women enrolled in the Medical School. The rental charge for a single room is Epworth Hall is $340.00 for the academic year or $85.00 per term. The rental charge for a double room is $570.00 for the academic year (4 terms) or $285.00 for each occupant, or $71.25 each occupant per term. There are no single rooms for medical women in Hanes House. The rental charge for a double room in Hanes House is $590.00 for the academic year (4 terms) or $295.00 for each occupant, or $73.75 each occupant per term.

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings, and the rental charges per month are $70.00 for the efficiency, $80.00 for the one-bedroom, and $90.00 for the two-bedroom. Heat, electricity except for window fans and air conditioners, hot and cold water, garbage and trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Residence hall rooms and Duke University Apartments may be reserved by new applicants only if they have been accepted officially for admission to the School of Medicine. Applications for residence halls rooms are to be made to the Housing Bureau, Duke Station, Durham, North Carolina. A $25.00 room deposit is required of each applicant before a residence hall room reservation is made. The initial room deposit is effective in making room reservations for each term of continuous residence. In the event that a student moves out of the residence hall for as much as one term, the initial deposit may no longer be used to reserve a room, except when residence away from the residence hall is a normal part of the academic program approved by the Dean of the School of Medicine. The deposit will be refunded under the following conditions:

a. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.

b. Upon withdrawal from Duke University residence halls by students enrolled on the semester basis, provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.

c. Upon withdrawal from Duke University residence halls by

students enrolled on the basis of the *medical term,* provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the term beginning in September, and not later than ten (10) days prior to the beginning of any subsequent medical term within the academic year.

d. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of his reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons who exchange rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Rooms are rented for the academic year but for no period of less than one term without special arrangements. After the day of registration, no refund of room rent will be made except for involuntarv withdrawal to enter the armed sevices. Such refunds will be made in accordance with the University's established schedule.

Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing. Occupants are expected to abide by these regulations.

The dining facilities in the Men's Graduate Center, Duke University Union, and the Woman's College Union are available to students of the Medical School. The cost for the academic year ranges from $450.00 upward, depending on the taste of the individual.

## *Motor Vehicle Registration*

Each motor vehicle operated on the campuses by students enrolled in the School of Medicine must be registered at 05 Allen Building within 5 days after arrival, and thereafter must display the proper registration emblem. To register a vehicle, the student must present the following documents:

1. State vehicle registration.
2. State operator's license.

3. Evidence of automobile liability insurance as required by North Carolina law: $5,000 per person and $10,000 per accident for personal injuries; and $5,000 property damage.

Parking, Traffic, and Safety Regulations will be given each student who registers his vehicle. Students are expected to abide by these regulations.

# Departments of Instruction

## *Anatomy*

Joseph E. Markee, Ph.D. (Chicago, 1929), *James B. Duke Professor of Anatomy, Chairman of the Department, and Assistant Dean in Charge of Admissions.*

John W. Everett, Ph.D. (Yale, 1932), *Professor of Anatomy.*

Duncan C. Hetherington, Ph.D. (Illinois, 1922), M.D. (Johns Hopkins, 1926), *Professor of Anatomy.*

Talmage L. Peele, M.D. (Duke, 1934), *Professor of Anatomy, Associate Professor of Neurology and Assistant Professor of Pediatrics.*

R. Frederick Becker, Ph.D. (Northwestern, 1940), *Associate Professor of Anatomy.*

W. Kenneth Cuyler, Ph.D. (Duke, 1941), *Associate Professor of Cytology and Anatomy.*

Kenneth L. Duke, Ph.D. (Duke, 1940), *Associate Professor of Anatomy.*

Montrose J. Moses, Ph.D. (Columbia, 1949), *Associate Professor of Anatomy.*

Frederick D. McFalls, M.D. (Duke, 1959), *Assistant Professor of Anatomy.*

John A. Goree, M.D. (Duke, 1955), *Associate in Anatomy and Assistant Professor of Radiology.*

Hertha R. Cress, Ph.D. (Duke, 1957), *Associate in Anatomy.*

Frank H. Bassett, III, M.D. (Louisville, 1957), *Associate in Anatomy and Assistant Professor of Orthopaedic Surgery.*

Benjamin D. Venetta, Ph.D. (Western Reserve, 1959), *Instructor in Anatomy.*

The required courses of instruction in human anatomy constitute about half of the integrated curriculum of the first year. The gross anatomy of the head, neck and trunk is studied during the first 14 weeks, histology during the first 10 weeks, neuroanatomy during the 28th to 36th weeks. The gross anatomy of the limbs is studied during the 19th to 27th weeks. All of the above are integrated with the other material studied during the first year. Emphasis is placed upon the study of the material in the laboratory. In an attempt to utilize more fully the laboratory time, audio-visual educational methods are employed as fully as possible. These techniques consist of color motion pictures of demonstration dissections, closed-circuit television, color lantern slides, and motion pictures, both embryologic and neurologic. All of the instruction is designed to be as informal and as nearly individual as possible. General principles and the functional viewpoint of living anatomy are stressed in the hope that the student may be stimulated to secure a working knowledge of anatomy in the broadest sense. Whenever possible, fresh tissues and living cells are made available for examination. Patients exemplifying anatomical principles are presented, some within the classroom, others over live television, and others are pre-recorded on videotape for later presenta-

tion at the appropriate time in the students' learning experience. Through the co-operation of the Department of Radiology, the students are given an opportunity to study portions of the living human body as revealed by the fluoroscope and roentgenograph. The following elective courses are offered:

*Demonstrations in Anatomy.* Using dissections already prepared, weekly demonstrations of selected regions or systems are made by the members of the group. Sixth quarter—Two hours per week by arrangement. Second-year students in groups of 10.

*Review in Anatomy.* During the sixth quarter, a review in anatomy will be presented by the audio-visual education methods outlined above, covering gross and neuro-anatomy, and histology.

*Special Neuro-anatomy.* Laboratory work and conferences upon selected portions of the human central nervous system. Limited to 6 junior or senior students. Two hours weekly by arrangement.

*Brain modeling.* Free-hand reconstruction in clay, from gross and sectioned material, of the chief tracts and nuclei of the human brain stem. By arrangement—4 to 10 students.

*Experimental Neurology.* An operative and laboratory study of the effect of various lesions upon the central and peripheral portions of the nervous system. Four to eight junior and senior students by arrangement. Prerequisite—operative surgery.

*Advanced Studies in Anatomy.* These may be arranged at any time under the direction of the various members of the staff.

*Review of Orthopaedic Anatomy.* A one hour weekly review of the anatomy related to orthopaedic surgery.

*Review of Surgical Anatomy.* A one hour weekly review of the anatomy related to general surgery.

*Anatomy Seminar.* One hour weekly meeting of students and staff in which current research problems in anatomy are presented.

*Interdisciplinary Seminar in the Physiological and Anatomical Bases of Behavior.* Weekly meeting of students and staff in which current problems in Anatomy, Physiology and Psychology Behavior will be presented. Many of the presentations will be made by visiting scholars who will also be available for small group discussions.

## *Biochemistry*

Philip Handler, Ph.D. (Illinois, 1939), *James B. Duke Professor of Biochemistry and Chairman of the Department.*

Charles Tanford, Ph.D. (Princeton, 1947), *Professor of Physical Biochemistry.*

Mary L. C. Bernheim, Ph.D. (Cambridge, 1928), *Associate Professor of Biochemistry.*

William L. Byrne, Ph.D. (Wisconsin, 1953), *Associate Professor of Biochemistry.*

Eugene A. Davidson, Ph.D. (Columbia, 1955), *Associate Professor of Biochemistry.*

Walter R. Guild, Ph.D. (Yale, 1951), *Associate Professor of Biophysics.*

Jerome S. Harris, M.D. (Harvard, 1933), *Associate Professor of Biochemistry, and Professor of Pediatrics.*

Robert L. Hill, Ph.D. (Kansas, 1954), *Associate Professor of Biochemistry.*

Henry Kamin, Ph.D. (Duke, 1948), *Associate Professor of Biochemistry and Principal Scientist at the Durham VA Hospital.*

William S. Lynn, M.D. (Columbia, 1946), *Associate Professor of Biochemistry and Medicine.*

Kenneth S. McCarty, Ph.D. (Columbia, 1957), *Associate Professor of Biochemistry.*

Ralph E. Thiers, Ph.D. (Toronto, 1947), *Associate Professor of Biochemistry and Director of the Clinical Chemistry Laboratory.*

Salih J. Wakil, Ph.D. (Washington, 1952), *Associate Professor of Biochemistry.*

James B. Wyngaarden, M.D. (Michigan, 1948), *Associate Professor of Biochemistry and Professor of Medicine.*

Irwin Fridovich, Ph.D. (Duke, 1955), *Assistant Professor of Biochemistry, U.S.P.H.S. Senior Fellow.*

Ronald C. Greene, Ph.D. (California Institute of Technology, 1954), *Assistant Professor of Biochemistry and Biochemist, Durham VA Hospital.*

Norman Kirshner, Ph.D. (Pennsylvania State, 1952), *Assistant Professor of Biochemistry and Experimental Surgery, U.S.P.H.S. Senior Research Fellow.*

Robert W. Wheat, Ph.D. (Washington U., 1955), *Assistant Professor of Biochemistry.*

Theodore Rosett, Ph.D. (London, 1955), *Instructor in Biochemistry.*

Eric Marler, M.D. (McGill, 1948), *Associate in Biochemistry and Medicine.*

Yasuhiko Nozaki, Ph.D. (Tokyo, 1945), *Research Associate in Biochemistry.*

Leo B. Daniels, *Technical Associate in Biochemistry.*

## FELLOWS

Victor Aleman-Aleman, M.D. (Universidad Nacional, Autonomia de Mexico, 1957), *Post-Doctoral Fellow in Biochemistry.*

Minoo H. Bilimoria, Ph.D. (Indian Institute of Science, 1962), *Post-Doctoral Fellow in Biochemistry.*

Robert Delaney, Ph.D. (Albany Medical College of Union University, 1962), *N. I. H. Special Postdoctoral Fellow.*

Harry W. Dougherty, Ph.D. (Columbia, 1962), *Post-Doctoral Fellow in Biochemistry.*

Harold J. Fallon, M.D. (Yale, 1957), *N. I. H. Special Postdoctoral Fellow.*

Robert E. Fellows, M.D. (McGill, 1959), *Post-Doctoral Fellow in Biochemistry.*

Kiyomichi Hanabusa, M.D., D.M.Sc. (Keio, 1954, 1960), *Post-Doctoral Fellow in Biochemistry.*

Thomas Harris, Ph.D. (Duke, 1959), *N. I. H. Special Postdoctoral Fellow.*

Takashi Hashimoto, M.D., Ph.D. (Gunma Univ., Univ. Tokyo, 1958, 1962), *Post-Doctoral Fellow in Biochemistry.*

Dolph L. Hatfield, Ph.D. (Univ. of Texas, 1962), *U.S.P.H.S. Postdoctoral Fellow in Biochemistry.*

Peter W. Holloway, Ph.D. (Univ. of Manchester, 1962), *Post-Doctoral Fellow in Biochemistry.*

Louis Kanarek, Ph.D. (Brussels, 1962), *Post-Doctoral Fellow in Biochemistry.*

Nobuhiko Katsura, D.D.S., Ph.D. (Tokyo School of Medicine and Dentistry, 1958, 1962), *Post-Doctoral Fellow in Biochemistry.*

Kazuo Kawahara, Ph.D. (Univ. Osaka, 1962), *Post-Doctoral Fellow in Biochemistry.*

Annette G. Kirshner, Ph.D. (Duke, 1963), *Post-Doctoral Fellow in Biochemistry.*

Akio Kiyomoto, Ph.D. (Chiba Univ., 1959), *Post-Doctoral Fellow in Biochemistry.*

Si Duk Lee, Ph.D. (Univ. of Maryland, 1961), *Advanced Research Fellow, American Heart Association.*

Bettie Sue Siler Masters, Ph.D. (Duke, 1963), *American Cancer Society Postdoctoral Fellow.*

A. H. Olavesen, Ph.D. (Univ. Birmingham, 1962), *Postdoctoral Fellow in Biochemistry.*

Roger Pain, Ph.D. (Univ. London, 1956), *Post-Doctoral Fellow in Biochemistry.*

Raul Peluffo, Ph.D. (La Plata Univ., 1942), *Consejo de Tureste Gacion de la Provincio de Buenos Aires Research Associate in Biochemistry.*

K. V. Rajagopalan, Ph.D. (Madras, 1957), *Post-Doctoral Fellow in Biochemistry.*

Frank Sauer, D.V.M., Ph.D. (Ontario Veterinary College, Univ. of Minn., 1951, 1957), *Visiting Research Associate Canada Department Agriculture.*

William James Smith, Ph.D. (Duke, 1963) *American Heart Association Postdoctoral Research Fellow.*

Henry O. Stone, Jr., Ph.D. (Duke, 1964), *Post-Doctoral Fellow in Biochemistry.*

P. Veeravagu, Ph.D. (Univ. of Louisville, 1958), *Post-Doctoral Fellow in Biochemistry.*

Moseley Waite, Ph.D. (Duke, 1963), *American Cancer Society Postdoctoral Fellow.*

The required course in biochemistry for first-year students is given over a period of twenty weeks in the fall and winter. The first phase is devoted to a survey of the chemistry of the materials fundamental to all life proteins, fats and carbohydrates, and the nature of enzymatic action. This is followed by consideration of those events in intermediary metabolism common to the life of all mammalian cells. The special metabolism of muscle, kidney, bone, erythrocytes, liver, connective tissue, and the chemical aspects of digestion, respiration, electrolyte, acid-base and fluid balance are presented with relation to the study of the physiology of these organs so as to facilitate integration and correlation of the two disciplines.

Since the success of the students in this course is largely determined by the adequacy and ready availability of their premedical training, it is urged that all students review the fundamental laws, theories, and facts of chemistry before the beginning of the course. A circular outlining the topics requiring special attention is sent to all students upon admission. Additional copies of the circular may be obtained from the Dean's Office.

*Biochemical Research.* The facilities of the department, including various types of research equipment and the clinical material of the blood chemistry laboratory, are available to properly qualified students for independent or supervised investigations. Chemical investigations of problems in biochemistry or in conjunction with the clinical and pathologic departments also may be conducted.

*Physical Biochemistry.* A four hour lecture and seminar course is given in the spring term.

*Nucleic Acids.* A two-hour lecture and seminar course is given in the spring term in alternate years.

*Intermediary Metabolism.* A four hour lecture and seminar course is given in the fall and spring terms.

# *Endocrinology*

James B. Wyngaarden, M.D. (Univ. of Michigan, 1948), *Professor of Medicine, Associate Professor of Biochemistry* (Director).

William M. Nicholson, M.D. (Johns Hopkins, 1931), *Professor of Medicine, Assistant Dean in Charge of Postgraduate Medical Education.*

Roy T. Parker, M.D. (Med. Col. Va., 1944), *Professor of Obstetrics and Gynecology.*

James B. Sidbury, Jr., M.D. (Columbia, 1947), *Associate Professor of Pediatrics, Director of Clinical Research Unit.*

Jack L. Kostyo, Ph.D. (Cornell, 1957), *Associate Professor of Physiology.*

William S. Lynn, M.D. (Columbia, 1946), *Associate Professor of Medicine and Biochemistry.*

Harry T. McPherson, M.D. (Duke, 1948), *Associate Professor of Medicine* (Director of Endocrine Clinic).

Charles H. Peete, Jr., M.D. (Harvard, 1947), *Associate Professor of Obstetrics and Gynecology.*

Robert S. Stempfel, Jr., M.D. (Vanderbilt, 1952), *Associate Professor of Pediatrics, Assistant Professor of Physiology.*

James O. Wynn, M.D. (Cornell, 1951), *Assistant Professor of Medicine.*

Rubin Bressler, M.D. (Duke, 1957), *Assistant Professor of Medicine* (Director of Diabetic Clinic).

Harold Lebovitz, M.D. (Pittsburgh, 1956), *Assistant Professor of Medicine* (Director of Endocrine Laboratory).

G. Eric Marler, M.D., C. M. (McGill University, 1958), *Associate in Medicine and Biochemistry.*

Harry Johnson, M.D. (Duke, 1955), *Associate in Obstetrics and Gynecology.*

Walter Lusk, M.D. (Emory, 1950), *Instructor in Medicine.*

Alberto Viau, M.D. (Univ. of Guatemala, 1950), *Visiting Associate Professor of Medicine.*

FELLOWS

Reid Bell, M.D. (Duke, 1953), *Pediatrics.*

William G. Blackard, M.D. (Duke, 1957), *Medicine.*

William W. Fore, M.D. (Duke, 1960), *Medicine.*

Lawrence A. Frohman, M.D. (Michigan, 1958), *Medicine.*

Saul Genuth, M.D. (Western Reserve, 1957), *Medicine.*

Elizabeth A. Lamb, M.D. (Tennessee, 1958), *Pediatrics.*

Daniel J. Martin, M.D. (St. Louis, 1959), *Obstetrics and Gynecology.*

Nelle S. Mosely, M.D. (Med. Col. Ga., 1957), *Pediatrics.*

Carlos Salcedo, M.D. (Universidad Del Valle, 1962), *Obstetrics and Gynecology.*

Bruce Squires, M.D., Ph.D. (Western Ontario, 1958 and 1962), *Medicine.*

Hiroshi Mori, M.D. (Nippon, Tokyo, 1953), *Obstetrics and Gynecology.*

Charles B. Hammond, M.D. (Duke, 1961), *Obstetrics and Gynecology.*

Robert E. Fellows, M.D. (McGill, 1959), *Biochemistry.*

Charles R. Roe, M.D. (Duke, 1964), *Pediatrics.*

The Division of Endocrinology was organized by Dr. E. C. Hamblen in 1936 as a division of the Department of Obstetrics and Gynecology. In 1955 it was reorganized as an integrated service with a staff drawn from several clinical and preclinical departments. Its objective is to give comprehensive training in basic and clinical endocrinology and

metabolism, particularly at the postgraduate level. Although individual senior staff members have their own special clinical and research programs, the division is organized so that clinics, conferences, ward rounds and seminars are participated in as joint ventures by the entire staff. The endocrine laboratory and its services are available to all members of the staff equally. Resident physicians from Medicine, Obstetrics and Gynecology and Pediatrics rotate through the Endocrine Division. At any one time there are usually four residents assigned to the division. Clinical and research fellows and trainees are assigned to individual senior staff members, depending on their major interest, but all participate essentially equally in the clinics, teaching rounds, conferences, etc.

The Endocrine Clinic meets four mornings and the Metabolism-Diabetes Clinic one morning each week. All fellows have the opportunity to attend these clinics and in addition the clinical fellows assist in the care of the private patients with endocrine and metabolic disturbances including diabetes. Twice a month the endocrine clinic meets jointly with the neurosurgical tumor follow-up clinic to review patients with pituitary tumors and related brain lesions. Ward rounds on in-patients are held from 4-5 p.m. Monday and Friday and at 9 a.m. on Wednesday each week. An endocrine conference is conducted weekly. In addition, each of the supporting services (Medicine, Obstetrics and Gynecology and Pediatrics) has special conferences, lectures and seminars of endocrine interest which are available to the staff.

## *Medicine*

Eugene Anson Stead, Jr., M.D. (Emory, 1932), *Florence McAlister Professor of Medicine and Chairman of the Department.*

Morton D. Bogdonoff, M.D. (Cornell, 1948), *Professor of Medicine.*

J. Lamar Callaway, M.D. (Duke, 1932), *Professor of Dermatology.*

E. Harvey Estes, M.D. (Emory, 1947), *Professor of Medicine.*

Oscar C. E. Hansen-Pruss, M.D. (Johns Hopkins, 1924), *Professor of Medicine.*

Albert Heyman, M.D. (Maryland, 1940), *Professor of Neurology.*

Walter Kempner, M.D. (Heidelberg, 1927), *Professor of Medicine.*

Grace P. Kerby, M.D. (Duke, 1946), *Professor of Medicine.*

Henry D. McIntosh, M.D. (Pennsylvania, 1950), *Professor of Medicine.*

Elijah E. Menefee, Jr., M.D. (Duke, 1936), *Professor of Medicine.*

William M. Nicholson, M.D. (Johns Hopkins, 1931), *Professor of Medicine in Charge of Diseases of Metabolism, and Assistant Dean in Charge of Postgraduate Education.*

Edward S. Orgain, M.D. (Virginia, 1930), *Professor of Medicine.*

Elbert L. Persons, M.D. (Harvard, 1927), *Professor of Medicine, Director of Student Health, and Associate Professor of Preventive Medicine and Public Health.*

Julian M. Ruffin, M.D. (Virginia, 1926), *Professor of Medicine.*

R. Wayne Rundles, M.D. (Duke, 1940), *Professor of Medicine.*

Herbert O. Sieker, M.D. (Washington University, 1948), *Professor of Medicine.*

J. Graham Smith, M.D. (Duke, 1950), *Professor of Dermatology.*

Malcolm P. Tyor, M.D. (Duke, 1946), *Professor of Medicine.*

James B. Wyngaarden, M.D. (Michigan, 1948), *Professor of Medicine, and Associate Professor of Biochemistry.*

James P. Hendrix, M.D. (Pennsylvania, 1930), *Associate Professor of Medicine and Therapeutics.*

Kaye H. Kilburn, M.D. (Utah, 1954), *Associate Professor of Medicine and Chief, Medical Service, Durham VA Hospital.*

William S. Lynn, M.D. (Columbia, 1946), *Associate Professor of Medicine, and Associate Professor of Biochemistry.*

Harry T. McPherson, M.D. (Duke, 1948), *Associate Professor of Medicine.*

Talmage L. Peele, M.D. (Duke, 1934), *Associate Professor of Neurology, Associate Professor of Anatomy, and Assistant Professor of Pediatrics.*

Ernst Peschel, M.D. (Berlin, 1930), *Associate Professor of Medicine.*

John B. Pfeiffer, M.D. (Cornell, 1942), *Associate Professor of Neurology.*

David T. Smith, M.D. (Johns Hopkins, 1922), *Associate Professor of Medicine, and James B. Duke Professor of Microbiology.*

William F. Barry, Jr., M.D. (Pennsylvania, 1946), *Assistant Professor of Medicine, and Associate Professor of Radiology.*

Rubin Bressler, M.D. (Duke, 1957), *Assistant Professor of Medicine.*

John F. Flanagan, M.D. (Duke, 1953), *Assistant Professor of Medicine, and Instructor in Microbiology.*

Walter L. Floyd, M.D. (Johns Hopkins, 1954), *Assistant Professor of Medicine.*

Samuel J. Friedberg, M.D. (Pennsylvania, 1952), *Assistant Professor of Medicine.*

Joseph C. Greenfield, M.D. (Emory, 1956), *Assistant Professor of Medicine.*

John Laszlo, M.D. (Harvard, 1955), *Assistant Professor of Medicine.*

Harold E. Lebovitz, M.D. (Pittsburgh, 1956), *Assistant Professor of Medicine.*

John R. Overman, M.D. (Duke, 1950), *Assistant Professor of Medicine, and Professor of Microbiology.*

E. Eugene Owen, M.D. (Washington University, 1956), *Assistant Professor of Medicine.*

Roscoe R. Robinson, M.D. (Oklahoma, 1954), *Assistant Professor of Medicine.*

Herbert A. Saltzman, M.D. (Jefferson, 1952), *Assistant Professor of Medicine.*

Robert E. Whalen, M.D. (Cornell, 1956), *Assistant Professor of Medicine.*

James O. Wynn, M.D. (Cornell, 1951), *Assistant Professor of Medicine.*

Stanley H. Appel, M.D. (N.Y. Med. Coll., 1960), *Associate in Medicine.*

Irwin A. Brody, M.D. (Pennsylvania, 1956), *Associate in Neurology.*

C. Edward Buckley, M.D. (Duke, 1954), *Associate in Medicine.*

James R. Clapp, M.D. (North Carolina, 1957), *Associate in Medicine.*

McDonald Dick, M.D. (Johns Hopkins, 1928), *Associate in Medicine, and Assistant Professor of Physiology and Pharmacology.*

T. David Elder, M.D. (Duke, 1957), *Associate in Medicine.*

Ralph J. Gorten, M.D. (Pennsylvania, 1955), *Associate in Medicine.*

J. Caulie Gunnells, M.D. (South Carolina, 1956), *Associate in Medicine.*

Rafael R. Hernandez, M.D. (Duke, 1958), *Associate in Medicine.*

O. William Jones, M.D. (Oklahoma, 1957), *Associate in Medicine.*

Thomas T. Jones, M.D. (Johns Hopkins, 1932), *Associate in Medicine.*

Robert F. Klein, M.D. (Alabama, 1955), *Associate in Medicine.*

Eric Marler, M.D. (McGill, 1958), *Associate in Medicine.*

Charles E. Mengel, M.D. (Johns Hopkins, 1957), *Associate in Medicine.*

James J. Morris, M.D. (State Univ. N. Y., 1959), *Associate in Medicine, and Resident, Medical Service, Durham VA Hospital.*

Barbara C. Newborg, M.D. (Johns Hopkins, 1949), *Associate in Medicine.*

Suydam Osterhout, M.D. (Duke, 1950), Ph.D. (Rockefeller Inst., 1959), *Associate in Medicine and Assistant Professor of Microbiology.*

Richard M. Portwood, M.D. (Southwestern, 1954), *Associate in Medicine.*

W. Mitchell Sams, M.D. (Emory, 1959), *Associate in Dermatology and Resident in Dermatology.*

Harold R. Silberman, M.D. (Washington Univ., 1956), *Associate in Medicine.*

Charles W. Styron, M.D. (Duke, 1938), *Associate in Medicine.*

Howard K. Thompson, M.D. (Columbia, 1953), *Associate in Medicine.*

Andrew G. Wallace, M.D. (Duke, 1959), *Associate in Medicine and Resident in Medicine.*

John S. Warner, M.D. (Vanderbilt, 1956), *Associate in Neurology.*

Sherwood W. Barefoot, M.D. (Duke, 1938), *Instructor in Dermatology.*

Woodrow W. Batten, M.D. (Bowman Gray, 1944), *Instructor in Medicine.*

Norman Bauman, M.D. (New York Univ., 1957), *Instructor in Medicine.*

William F. Blackard, M.D. (Duke, 1957), *Instructor in Medicine.*

Gray T. Boyette, M.D. (Bowman Gray, 1960), *Instructor in Medicine.*

Paul C. Campbell, M.D. (Buffalo, 1936), *Instructor in Dermatology.*

A. Derwin Cooper, M.D. (George Washington, 1932), *Instructor in Medicine.*

George W. Crane, M.D. (Northwestern, 1946), *Instructor in Dermatology.*

Roy H. Dippy, M.D. (Emory, 1956), *Instructor in Medicine.*

John L. Farmer, M.D. (Duke, 1955), *Instructor in Dermatology.*

Walter C. Fitzgerald, M.D. (Virginia, 1943), *Instructor in Dermatology.*

Lawrence A. Frohman, M.D. (Michigan, 1958), *Instructor in Medicine.*

Glen A. Garrison, M.D. (Bowman Gray, 1958), *Instructor in Medicine.*

Saul A. Genuth, M.D. (Western Reserve, 1957), *Instructor in Medicine.*

Charles W. Harris, M.D. (North Carolina, 1960), *Instructor in Medicine.*

Thomas H. Harrison, M.D. (Duke, 1957), *Instructor in Medicine, and Resident in Neurology.*

Charles P. Hayes, M.D. (Duke, 1959), *Instructor in Medicine.*

Leo J. Heaphy, M.D. (Buffalo, 1956), *Instructor in Medicine.*

Jacqueline C. Hijmans, M.D. (State Univ., Leyden, 1949), *Instructor in Medicine.*

S. Frank Horne, M.D. (Duke, 1942), *Instructor in Dermatology.*

James C. Hurlburt, M.D. (Duke, 1957), *Instructor in Medicine.*

Emmett S. Lupton, M.D. (N.Y.U., 1938), *Instructor in Dermatology.*

John A. Lusk, M.D. (Alabama, 1951), *Instructor in Medicine.*

Walter C. Lusk, M.D. (Emory, 1950), *Instructor in Medicine.*

Harold J. Lynch, M.D. (Georgetown, 1957), *Instructor in Medicine.*

Thomas G. McGinn, M.D. (State Univ. N.Y., 1957), *Instructor in Medicine.*

Hiroshi Nagaya, M.D. (Tokyo, 1956), *Instructor in Medicine.*

George W. Paulson, M.D. (Duke, 1956), *Instructor in Neurology.*

Charles E. Rackley, M.D. (Duke, 1958), *Instructor in Medicine.*

J. Sidney Rice, M.D. (Ohio State, 1940), *Instructor in Dermatology.*

Waguih M. Roufail, M.D. (Cairo, 1957), *Instructor in Medicine.*

Allen D. Smith, M.D. (Georgia, 1937), *Instructor in Dermatology.*

Bruce P. Squires, M.D. (Western Ontario, 1958), *Instructor in Medicine.*

Paul D. Webster, M.D. (Bowman Gray, 1956), *Instructor in Medicine.*

David G. Welton, M.D. (Wisconsin, 1935), *Instructor in Dermatology.*

Ruby L. Wilson, B.S.N. (Pittsburgh, 1954), *Instructor in Medicine.*
Donald Aanerud, *Research Associate in Medicine and in Surgery.*
George E. Koury, M.D. (Tulane, 1944), *Assistant in Medicine.*
Gilberto Nagle, M.D. (Brazil, 1955), *Visiting Instructor in Medicine.*
Virginia J. Neelon, B.S.N. (Duke, 1957), *Research Associate in Medicine.*
Ruth L. Peschel, M.D. (Berlin, 1931), *Research Assistant in Medicine.*
Clotilde Schlayer, Ph.D. (Heidelberg, 1927), *Research Assistant in Medicine.*
Preston W. Smith, *Technical Associate in Clinical Microscopy.*
C. Frank Starmer, B.S. (Duke, 1963), *Research Associate in Medicine.*
Alberto Viau, M.D. (Guatemala, 1950), *Visiting Associate Professor of Medicine.*

### FELLOWS

Robert S. Brice, M.D. (Duke, 1960).
Ronnie L. Cox, M.D. (Duke, 1961).
Franklin P. Dalton, M.D. (Duke, 1960).
William W. Fore, M.D. (Duke, 1960).
David H. Holloway, M.D. (Tennessee, 1961).
Yi-Hong Kong, M.D. (Taiwan, 1958).
Patrick A. McKee, M.D. (Oklahoma, 1962).
Earl N. Metz, M.D. (Duke, 1961).
Donald S. Miller, M.D. (Harvard, 1962).
Stanley S. Moles, M.D. (Duke, 1958).
Francis A. Neelon, M.D. (Harvard, 1962).
John B. Nowlin, M.D. (Duke, 1957).
Jon P. Tipton, M.D. (Ohio State, 1960).
William G. Troyer, M.D. (Pittsburgh, 1960).

### ASSISTANT RESIDENTS

John P. Boineau, M.D. (Duke, 1959).
Richard I. Breuer, M.D. (Yale, 1957).
William S. Collins, M.D. (Duke, 1960).
Joe B. Currin, M.D. (Bowman Gray, 1961).
Glen R. Finlayson, M.D. (Utah, 1961).
Robert E. Gaddy, M.D. (Duke, 1959).
William M. Ginn, M.D. (North Carolina, 1959).
Amos C. Gipson, M.D. (Vanderbilt, 1960).
Sheldon Goldgeier, M.D. (Maryland, 1958).
Harvey E. Grode, M.D. (Duke, 1960).
Charles E. Harrison, M.D. (Emory, 1960).
H. Courtenay Harrison, M.D. (Duke, 1959).
Martin A. Hatcher, M.D. (Duke, 1962).
Edward S. Horton, M.D. (Harvard, 1957).
Marvin Kahn, M.D. (Johns Hopkins, 1958).
Elizabeth P. Kanof, M.D. (New York, 1960).
Julian Katz, M.D. (Chicago, 1962).
Nicholas M. Kredich, M.D. (Michigan, 1962).
Kenneth M. Lloyd, M.D. (Michigan, 1959).
William C. McAfee, M.D. (Tennessee, 1961).
Richard V. McCloskey, M.D. (Rochester, 1960).
James W. Myers, M.D. (Ohio State, 1962).

Jerome Ruskin, M.D. (Albert Einstein, 1960).
Fred W. Schoonmaker, M.D. (Colorado, 1961).
Richard K. Shadduck, M.D. (State Univ. N.Y., 1962).
Joseph W. Stiefel, M.D. (Tennessee, 1958).
Richard C. Stone, M.D. (Duke, 1962).
Raymond M. Taniguchi, M.D. (Tulane, 1960).
Joel R. Temple, M.D. (Jefferson, 1960).
John M. Thompson, M.D. (Western Ontario, 1961).
Bart L. Troy, M.D. (Columbia, 1961).
Roger G. Vieth, M.D. (Duke, 1959).
John E. Watt, M.D. (Kansas, 1962).
H. Lake Westfall, M.D. (Duke, 1960).
Howard J. Zeft, M.D. (Columbia, 1962).

INTERNS

Raymond H. Alexander, M.D. (Duke, 1964).
Willis H. Bell, M.D. (Duke, 1964).
Bernard A. Bernstein, M.D. (State Univ. N.Y., 1963).
Joseph O. Broughton, M.D. (Duke, 1963).
William A. Carter, M.D. (Duke, 1963).
Charles T. Caskey, M.D. (Duke, 1963).
Wesley A. Cook, M.D. (Oregon, 1963).
Anthony R. Dowell, M.D. (Indiana, 1963).
Doyle Driver, M.D. (Duke, 1963).
Ray R. Durrett, M.D. (Duke, 1963).
George J. Ellis, M.D. (Harvard, 1963).
Sidney R. Fortney, M.D. (Duke, 1963).
Lee S. Harris, M.D. (Duke, 1964).
Chester C. Haworth, M.D. (Duke, 1963).
William M. Hull, M.D. (Duke, 1963).
Peter O. Kohler, M.D. (Duke, 1963).
Lester J. Krasnoger, M.D. (New York, 1963).
Samuel J. Lathan, M.D. (Johns Hopkins, 1963).
Charles M. Mansbach, M.D. (New York, 1963).
Huey G. McDaniel, M.D. (Alabama, 1963).
J. Frederic Mushinski, M.D. (Harvard, 1963).
Bert W. O'Malley, M.D. (Pittsburgh, 1963).
Alexander G. Reeves, M.D. (Cornell, 1963).
Haskel Schiff, M.D. (New York, 1963).
John S. Simmonds, M.D. (Columbia, 1963).
William T. Sparrow, M.D. (Southwestern, 1963).
Roger W. Turkington, M.D. (Harvard, 1963).
Alan C. Whitehouse, M.D. (Cincinnati, 1963).
Noel W. Young, M.D. (Duke, 1963).

The Department of Medicine traditionally has the responsibility of preparing the student for a lifetime of learning as he gives care to patients who ask him for help. The first step is to begin to think and act like a doctor. Two courses in the second year—Introduction to

Clinical Practice and Clinical Microscopy—prepare the student so that he can take an active role in patient care.

In the third and fourth years, the student assigned to Medicine acts in the role of a physician. His desire to give good care is the motive which drives him to excellence. He learns to properly identify the problems of the patient. Having identified the problems, he marshalls the information which he can bring to bear on them by his past training; he recognizes the gaps in his knowledge as he attempts to focus the information learned from the basic sciences onto the specific clinical problem. Using the patient as his means of integration, he re-reads his anatomy, physiology, microbiology, pharmacology and biochemistry. In this clinical setting he has the opportunity to speak many words which he has previously only read; he discusses the problem with his fellow students, interns, residents and senior staff; he gains familiarity with ideas and concepts by actively manipulating them.

The student crystallizes his idea of the best diagnostic and therapeutic approach to this particular patient. He identifies the reasons for each of these decisions. He has real curiosity to see if his evaluation of the situation is correct or if he will have to admit that certain data which he had interpreted as rock-like support for his house of cards have turned out to be shifting sand. He learns that the course of biology is uninfluenced by strong statements, by the rank of the faculty member, or by the number of supporting references not quite applicable to the points in question.

Under guidance from his fellow students and from faculty of all ranks, he slowly appreciates the difficulties of learning in this system of multiple variables operating on only partially defined substrates. Part of a doctor's learning is only experimental. He knows from living with his patients that certain things are possible, but he does not know the underlying sequence of events. In other instances, his learning is more precise because he understands and can control some of the important variables. He must learn both the liabilities and virtues of attempting to use logic in clinical practice.

The goal of the Department of Medicine is for the student to have as many learning experiences as possible in which he plays an active role. We hope that he will enjoy these learning experiences so much that he will continue them as long as he sees patients. We are not interested in covering the entire field of medicine. If one of our graduates meets a new problem, correctly identifies it and has pleasure in solving it, we are satisfied. We are not concerned that a new area of knowledge is being explored without our guidance.

In caring for our patients with ill-defined genetic and acquired differences and with many variables of unknown strength at play,

many erroneous conclusions are drawn. The student has to learn to examine statements both oral and written with care and to ask of all authorities the source of data which underly their conclusions. One way for the student to learn the difficulties in drawing accurate conclusions about biological systems is to give him the opportunity to establish some fact on the basis of his own work. We call this research and find it a very effective method of teaching. The intellectual discipline involved better prepares him for the role of a lifetime learner.

The health field is a broad one. Anyone with intelligence enough to gain entrance to the Medical School can find an area where he can be happy and productive. We are interested in producing manpower for the entire field. We are not interested in molding our students into any single career in the health field. The faculty accepts the fact that our intake is heterogeneous and that our output will be heterogeneous. Our role is to identify the area where the individual will be most productive and happy, and to help him reach this goal. We will continue to produce general practitioners, specialists, administrators, research workers, biologists, government workers and various combinations. There is no special honor attached to any of these roles. Our primary interest is that our graduates are productive, and receive emotional and intellectual satisfaction from their work.

*Introduction to Clinical Medicine.* This course is initiated in January of the second year by introductory lectures, case discussions and instruction in methods of physical examination and history taking. Early in the course, students begin work at the bedside in the examination of selected patients. The emphasis throughout is placed on instruction individually and in small groups. The interpretation and pathologic physiology of abnormal findings are stressed. Instruction in the more specialized methods of examination is provided by coordinating the lectures, case discussions and individual student instruction from the departments of Medicine, Neurology, Obstetrics and Gynecology, Pediatrics, Psychiatry, Radiology and Surgery. In addition, the lectures and laboratory sessions in Clinical Microscopy are coordinated with the over-all program. In the latter part of the year special emphasis is placed on student correlation of the history, physical finding and pathologic physiology in the individual patient problem.

*Clinical Microscopy* is given in the second year. This course, along with lectures and assignments providing practice in history taking and physical diagnosis, comprises an introduction to medicine designed to equip the student to participate in patient care on the wards and in the clinics. The essentials of hematology are reviewed. Laboratory work includes blood cell counts, the preparation and interpretation of blood films, and the examination of fresh material, such as urine,

stools, spinal fluids, sputum, transudates and exudates. Second-year and senior students are given opportunities for special work and for investigation. This course is supplemented in the junior and senior years by hematology conferences and by daily ward and laboratory rounds.

*Junior and Senior Medicine.* The student usually spends one term of his junior and senior year in Medicine where he is assigned to one of the medical wards or to the medical clinic. He forms part of a medical team composed of third- and fourth-year students, interns, first-year residents and senior staff, and takes an active part in the care of patients. The number of patients assigned to him does not vary with the load. He is given this protection to allow him time for synthesis of his basic science experiences with the problems of his patients. When indicated, the undergraduate experiences are integrated with the graduate program. In such an instance, the program of each student is worked out individually.

Many students take an elective term in one of the following medical specialties:

Allergy—Drs. Hansen, Sieker and Buckley
Behavioral Medicine—Drs. Bogdonoff and Klein
Cardiology—Drs. Orgain, Estes, Floyd, McIntosh and Whalen
Chest—Drs. Kilburn, Menefee and Saltzman
Dermatology—Drs. Callaway and Smith
Endocrinology—Drs. Wyngaarden, McPherson, Wynn, Bressler and Lebovitz
Gastroenterology—Drs. Ruffin, Tyor and Owen
Hematology and Cancer Chemotherapy—Drs. Rundles, Laszlo, Silberman and Mengel
Hypertensive Vascular Disease—Drs. Kempner and Peschel
Infectious Diseases—Drs. Osterhout and Flanagan
Metabolism—Drs. Nicholson, Lynn and Bressler
Neurology—Drs. Heyman, Pfeiffer, Peele and Warner
Renal Disease—Dr. Robinson
Rheumatoid Diseases—Drs. Persons and Kerby
Therapeutics—Dr. Hendrix
Metabolic Diseases of Genetic Origin—Drs. Wyngaarden and Elder

Students who have elected to take a year in the Research Training area and are going to take graduate work in Medicine or Pediatrics are not required to take Senior Medicine. Any student of unusual ability who is going to take graduate work in Medicine may modify the undergraduate program in Medicine in ways which will make his graduate experience more profitable.

# *Microbiology and Immunology*

Norman F. Conant, Ph.D. (Harvard, 1933), *James B. Duke Professor of Microbiology and Chairman of the Department.*

David T. Smith, M.D. (Johns Hopkins, 1922), *James B. Duke Professor of Microbiology and Associate Professor of Medicine.*

John E. Larsh, Jr., Sc.D. (Johns Hopkkins, 1943), *Professor of Parasitology at Duke and UNC.*

D. Bernard Amos, M.B. (London, 1951), *Professor of Immunology and Associate Professor of Experimental Surgery.*

Joseph W. Beard, M.D. (Vanderbilt, 1929), *Associate Professor of Virology and James B. Duke Professor of Surgery.*

John R. Overman, M.D. (Duke, 1950), *Professor of Microbiology, Assistant Professor of Medicine.*

Hilda Pope Willett, Ph.D. (Duke, 1949), *Professor of Microbiology.*

Samson R. Gross, Ph.D. (Columbia University, 1953), *Associate Professor of Microbiology.*

Eugene D. Day, Ph.D. (Delaware, 1952), *Associate Professor of Immunology.*

Suydam Osterhout, M.D. (Duke, 1950), Ph.D. (Rockefeller Inst., 1959), *Assistant Professor of Microbiology, Associate in Medicine.*

Richard S. Metzgar, Ph.D. (Buffalo, 1959), *Assistant Professor of Immunology.*

Chester Zmijewski, Ph.D. (Buffalo, 1960), *Assistant Research Professor of Immunology.*

C. Edward Buckley, M.D. (Duke, 1954), *Associate in Immunology.*

Armand Gilbert Eiring, Ph.D. (Duke, 1962), *Instructor in Microbiology.*

John F. Flanagan, M.D. (Duke, 1953), *Instructor in Microbiology, Associate in Medicine.*

H. William Craig, *Technical Associate in Serology.*

### FELLOWS

William Boyle, Ph.D. (Glasgow Univ., 1963), *Fellow in Immunology.*

Rebecca H. Buckley, M.D. (Univ. North Carolina, 1958), *Instructor in Pediatrics and Fellow in Immunology.*

Raymond Mark, M.D. (Yale, 1959), *Fellow in Immunology.*

Anja Tiilikainen, M.D. (U. of Helsinki, 1960), *Fellow in Immunology.*

Richard H. Batchelor, M.D. (Cambridge, 1959), *Fellow in Immunology.*

*Bacteriology, Immunology, and Mycology.* The required course is given in the first term of the second year. An intensive study is made of the common bacteria, fungi, and viruses which cause disease in man. The scope of the laboratory course is reasonably wide and acquaints the students with all the methods and procedures employed in bacteriologic laboratories. Most of the lecture time is devoted to the immunologic and epidemiologic aspects of infection. The instruction is designed to give the students a clear conception of: (1) how organisms gain entrance to the body, (2) the type of poisons which they produce, (3) the nature of the immune bodies which are produced by the host, and (4) the methods of preventing the disease by active and passive immunization.

*Research Microbiology.* Opportunities for original investigations are afforded a few specially qualified students.

*Clinical Microbiology.* During their clinical clerkships on medicine (one quarter each for junior and senior classes), the students may perform the routine and special bacteriologic work of the patients assigned to them on the teaching service, under the direction of the Department of Bacteriology and in parallel with the Biologic Division of the medical clinic.

*Immunology.* Emphasis is placed upon the informal teaching and training of those students who have a special interest in the general field of immunology. An elective course of lectures in advanced immunology together with a seminar series is given to students who have completed the course in Bacteriology and Immunology. Besides reviewing recent developments in knowledge about the induction of immunity and the production of antibodies, the course covers the actions of complement, the reactions of the vascular system and of immune cells, and the mechanisms of auto-immune and immunogenetic processes. A large colony of inbred animals is maintained which may be used for research purposes by graduate and senior students wishing to use the laboratory facilities for their own projects under supervision of the staff.

## *Obstetrics and Gynecology*

Francis Bayard Carter, M.D. (Johns Hopkins, 1925), *Professor of Obstetrics and Gynecology and Chairman of the Department.*

Robert Nowell Creadick, M.D. (Yale, 1937), *Professor of Obstetrics and Gynecology.*

Roy Turnage Parker, M.D. (Med. Coll., Va., 1944), *Professor of Obstetrics and Gynecology.*

Walter Lee Thomas, M.D. (Virginia, 1931), *Professor of Obstetrics and Gynecology.*

Walter Boris Cherny, M.D. (McGill, 1950), *Associate Professor of Obstetrics and Gynecology.*

Charles Henry Peete, Jr., M.D. (Harvard, 1947), *Associate Professor of Obstetrics and Gynecology.*

Violet Horner Turner, M.D. (Chicago, 1940), *Assistant Professor of Obstetrics and Gynecology.*

Harry Wallace Johnson, M.D. (Duke, 1955), *Assistant Professor of Obstetrics and Gynecology and Director of Endocrine Clinic.*

Eleanor Beamer Easley, M.D. (Duke, 1934), *Associate in Obstetrics and Gynecology.*

Christa Von Roebel, M.D. (Leipzig, 1937), *Associate in Obstetrics and Gynecology.*

Leonard Palumbo, M.D. (Duke, 1944), *Visiting Lecturer in Obstetrics and Gynecology.*

Robert Alexander Ross, M.D. (Pennsylvania, 1922), *Visiting Lecturer in Obstetrics and Gynecology.*

Trogler Francis Adkins, M.D. (Duke, 1936), *Instructor in Obstetrics and Gynecology.*

William Alexander Graham, M.D. (Pennsylvania, 1932), *Instructor in Obstetrics and Gynecology.*

Richard Lehmer Pearse, M.D. (Harvard, 1931), *Instructor in Obstetrics and Gynecology.*

Kenneth Arthur Podger, M.D. (Duke, 1941), *Instructor in Obstetrics and Gynecology.*

W. Kenneth Cuyler, Ph.D. (Duke, 1941), *Research Instructor in Obstetrics and Gynecology.*

Claudius Parks Jones, M.T. (Duke, 1935), *Research Instructor in Obstetrics and Gynecology.*

RESIDENTS

Henri D. Clarke, M.D. (Med. Coll. of Georgia, 1958).

Leslie S. Massad, M.D. (Rochester Med. School, 1958).

ASSISTANT RESIDENTS

John S. Glover, M.D. (Duke, 1959).

Thomas H. White, M.D. (Duke, 1959).

Samuel M. Atkinson, Jr., M.D. (Duke, 1961).

W. Allen Addison, M.D. (Duke, 1960).

Charles B. Hammond, M.D. (Duke, 1961).

Warner L. Hall, Jr., M.D. (Duke, 1961).

Abraham I. Sobel, M.D. (Univ. of Virginia, 1959).

Harry W. Huneycutt, M.D. (Duke, 1961).

Robert W. Seaton, M.D. (Univ. of Tennessee, 1960).

Maurice N. Courie, M.D. (Duke, 1959).

Zachariah B. Newton, III., M.D. (Jefferson Med. Coll., 1962).

Frank I. Nicks, Jr., M.D. (Duke, 1962).

William B. Waddell, M.D. (Duke, 1962).

John B. Younger, M.D. (Tulane, 1962).

Second year students receive 22 hours of instruction in the fundamentals of Obstetrics, Gynecology and Endocrinology during their course in physical diagnosis.

During one quarter of the junior year each student group attends Ward Rounds at 8:30 a.m. on Mondays, Wednesdays, and Saturdays; Preoperative and Pre-delivery Conferences on Tuesdays, and Fridays; tutorials on Mondays, Tuesdays and Wednesdays; Pathology Conferences on Thursdays and Staff Meetings on Fridays with members of the staff and the staff of other departments. They also attend an Endocrine Clinic once a week; an abnormal Obstetric Clinic once a week; and the regular Out-Patient Clinic five times weekly for nine weeks. The students are also assigned patients on the Obstetric and Gynecologic Wards.

## *Pathology*

Thomas D. Kinney, M.D. (Duke, 1937), *Professor of Pathology and Chairman of the Department.*

Wiley D. Forbus, M.D. (Johns Hopkins, 1923), *Professor of Pathology.*

Donald B. Hackel, M.D. (Harvard, 1946), *Professor of Pathology.*

Nathan Kaufman, M.D. (McGill, 1941), *Professor of Pathology.*

Janis V. Klavins, M.D. (University of Kiel, M.D., 1948; Ph.D., 1959), *Professor of Pathology.*

F. Stephen Vogel, M.D. (Western Reserve, 1944), *Professor of Pathology.*

Bernard F. Fetter, M.D. (Duke, 1944), *Associate Professor of Pathology.*

Stanley M. Kurtz (Alabama, M.D., 1958; George Washington, Ph.D., 1953), *Associate Professor of Pathology.*

Albert G. Smith, M.D. (Washington University, 1947), *Associate Professor of Pathology.*

Jacinto J. Vazquez, M.D. (Univ. of Havana, 1948), *Associate Professor of Pathology.*

Jane G. Elchlepp (Chicago, M.D., 1955; Iowa, Ph.D., 1948), *Assistant Professor of Pathology.*

A. Wendell Musser, M.D. (Indiana University, 1956), *Assistant Professor of Pathology and Chief of the Laboratory Services, VA Hospital.*

Joachim R. Sommer, M.D. (Munich, 1950), *Assistant Professor of Pathology.*

Benjamin Wittels, M.D. (Minnesota, 1952), *Assistant Professor of Pathology.*

Glen R. Gale, Ph.D. (Duke, 1952), *Associate in Pathology.*

William W. Johnston, M.D. (Duke, 1959), *Associate in Pathology.*

Robert Lea Stuber, M.D. (St. Louis University, 1956), *Associate in Pathology.*

Sarah S. Polt, M.D. (Woman's College of Pennsylvania, 1957), *Associate in Pathology.*

Martha D. Vazquez, M.D. (Univ. of Havana, 1948), *Associate in Pathology.*

Carl M. Bishop, *Technical Associate in Pathology.*

Peteris Kalnins, *Technical Associate in Cytology.*

J. Phillip Pickett, *Technical Instructor in Pathology.*

Eubert J. Daniel, Ph.D. (University of Chicago, 1959), *Research Associate.*

William Jurgelsky, Jr., Ph.D. (Rutgers, 1958), *Research Associate.*

## FELLOWS

Joseph Douglas Balentine, M.D. (Medical College of South Carolina, 1963), *Fellow in Neuropathology.*

Gordon K. Klintworth, M.D. (University of Witwatersrand, 1957), *Fellow in Neuropathology.*

Donald James Kroe, M.D. (Duke, 1963), *Fellow in Pathology.*

Arthur M. Martin, Jr., M.D. (Duke, 1961), *Fellow in Pathology.*

Jackson H. McCarter, M.D. (University of Pittsburgh, 1963), *Fellow in Pathology.*

Ivan L. Peacocke, M.D. (Vanderbilt, 1958), *Fellow in Pathology.*

Joseph H. Riddick, Jr., M.D. (Duke, 1962), *Fellow in Neuropathology.*

## RESIDENTS

Charles C. Barringer, M.D. (Jefferson Medical College, 1946), *Assistant Resident.*

Charles Binford, M.D. (Virginia, 1959), *Assistant Resident.*

Robert R. Cole, M.D. (University of Arkansas, 1961), *Assistant Resident.*

Barrett W. Dick, M.D. (Washington University, 1963), *Assistant Resident.*

John G. Guccion, M.D. (Georgetown University, 1962), *Assistant Resident.*

Nirmala Krishnan, M.D. (Madras Medical College, 1956) *Resident.*

Michael H. Leakan, M.D. (University of Maryland, 1960), *Assistant Resident.*

Corpus O. Ortigoza, M.D. (Baylor, 1959), *Assistant Resident.*

Tung Pui Poon, M.D. (Ling-Nan, 1952), *Assistant Resident.*

Shafik F. Richany (University of Wisconsin, M.D., 1957; Ph.D. 1955), *Assistant Resident.*

Lawrence A. Taylor, M.D. (University of North Carolina, 1963), *Assistant Resident.*

*General Pathology:* The course in general pathology is giving during the first and second terms of the second year. The fundamentals of pathology are presented to the student by a correlated study of gross and microscopic material illustrating the structural changes in disease. Lectures developing broad concepts of disease processes are given by the members of the senior staff. Conferences with small groups of students under the guidance of a staff member are scheduled for purposes of more intimate discussion. The emphasis is placed on etiology and pathogenesis of disease and the experimental approach to an understanding of disease. Animal experiments performed either by students or by demonstrators are used to correlate functional and structural changes in disease. The group work is supplemented by weekly conferences involving the class as a whole and dealing with problems presented by current autopsies and with other problems of general importance. Student collaboration in post-mortem studies is required. Cases thus studied are presented by the student before the class under the direction of the staff; this takes the form of a clinical-pathologic conference in which each student plays a particular role.

*Elective Courses.* Special courses in pathology are given to students who have completed the course in general pathology. These courses are available through special arrangement.

*Clinical-Pathologic Conference (CPC):* A weekly clinical-pathologic conference for advanced study is held on Saturdays. It is open to all persons interested. Attendance by all the students is expected. Miscellaneous weekly pathologic conferences dealing with current cases under treatment on the various services are held for instruction of the staffs concerned.

*Student Research.* Research facilities are provided for interested students. Those who desire to carry out investigative work are given every encouragement and are allowed to work independently or in collaboration with the staff.

*Postgraduate Instruction:* The Department is composed of senior members, fellows and resident staff. The fellows and residents are active teachers as well as advanced students of disease. Ample opportunity for the development of a career in the field of pathology is provided for these men.

*Medicolegal Instruction:* The department works in close co-operation with the North Carolina State Medical Examiner System. Special medicolegal investigation for others are undertaken from time to time. The department collaborates with other departments of the Schools of Medicine and Law in a course in legal medicine that is given in alternate years.

# *Pediatrics*

Jerome Sylvan Harris, M.D. (Harvard, 1933), *Professor of Pediatrics, Chairman of the Department, and Associate Professor of Biochemistry.*

Wilburt Cornell Davison, M.D. (Johns Hopkins, 1917), *James B. Duke Professor of Pediatrics Emeritus.*

Jay Morris Arena, M.D. (Duke, 1932), *Professor of Pediatrics.*

Daniel Cady Darrow, M.D. (Johns Hopkins, 1920), *Adjunct Professor of Pediatrics.*

Susan Coons Dees, M.D. (Johns Hopkins, 1934), *Professor of Pediatrics.*

Angus M. McBryde, M.D. (Pennsylvania, 1927), *Professor of Pediatrics.*

William J. A. DeMaria, M.D. (Duke, 1948), *Associate Professor of Pediatrics and Professor of Preventive Medicine.*

James Buren Sidbury, Jr., M.D. (P & S, Columbia Univ., 1947), *Associate Professor of Pediatrics and Director, Clinical Research Unit.*

Robert S. Stempfel, Jr., M.D. (Vanderbilt Univ., 1952), *Associate Professor of Pediatrics.*

Samuel O. Cornwall, M.D. (Univ. of Minnesota, 1955), *Assistant Professor of Pediatrics.*

John A. Fowler, M.D. (Bowman-Gray, 1946), *Assistant Professor of Pediatrics and Professor of Psychiatry.*

Harold J. Harris, M.D. (Long Island Coll. of Med., 1949), *Assistant Professor of Pediatrics and Associate Professor of Psychiatry.*

Leslie B. Hohman, M.D. (Johns Hopkins, 1917), *Assistant Professor of Pediatrics and Professor of Pediatrics Emeritus.*

Arthur Hill London, M.D. (Pennsylvania, 1927), *Assistant Professor of Pediatrics (Duke) and Clinical Professor of Pediatrics (UNC).*

Hans Lowenbach, M.D. (Hamburg, 1929), *Assistant Professor of Pediatrics and Professor of Psychiatry.*

Talmage L. Peele, M.D. (Duke, 1934), *Assistant Professor of Pediatrics, Professor of Anatomy, and Assistant Professor of Neurology.*

Madison S. Spach, M.D. (Duke, 1954), *Assistant Professor of Pediatrics.*

James David Jones, M.D. (Duke, 1954), *Associate in Pediatrics and Assistant Professor of Psychiatry.*

E. Croft Long, M.B., B.S., Ph.D. (Univ. of London, 1952 and 1957), *Associate in Pediatrics and Associate Professor of Physiology.*

Adhemar W. Renuart, M.D. (Duke, 1956), *Associate in Pediatrics.*

Alexander Spock, M.D. (Univ. of Maryland, 1955), *Associate in Pediatrics.*

George A. Watson, Jr., M.D. (Duke, 1939), *Associate in Pediatrics.*

J. Street Brewer, M.D. (Jefferson, 1919), *Instructor in General Practice.*

Amos N. Johnson, M.D. (Pennsylvania, 1933), *Instructor in General Practice.*

Thomas T. Jones, M.D. (Johns Hopkins, 1932), *Instructor in General Practice.*

Harriette Amey, A.B. (N. C. Coll., 1944), *Instructor in Pediatric Social Service.*

Rebecca Hatcher Buckley, M.D. (Univ. of N.C., 1958), *Instructor in Pediatrics and Fellow in Immunology.*

Frederick T. Eastwood, M.D. (Temple, 1944), *Instructor in Pediatrics.*

Norbert B. Enzer, M.D. (McGill Univ., 1956), *Instructor in Pediatrics and Resident in Psychiatry.*

William W. Farley, M.D. (Med. Coll. of Virginia, 1943), *Instructor in Pediatrics.*

David A. Lockhart, M.D. (Duke, 1951), *Instructor in Pediatrics.*

William L. London, M.D. (Univ. of N.D., 1955), *Instructor in Pediatrics.*

Charles B. Neal, III, M.D. (Duke, 1955), *Instructor in Pediatrics.*

Shirley Kirkman Osterhout, M.D. (Duke, 1957), *Instructor in Pediatrics.*

A. Douglas Rice, M.D. (Duke, 1951), *Instructor in Pediatrics.*

Dorothy B. Shearin, M.D. (Woman's Med. Coll. of Pennsylvania, 1954), *Instructor in Pediatrics.*

Benjamin S. Skinner, M.D. (Washington, 1940), *Instructor in Pediatrics.*

Bailey Webb, M.D. (Duke, 1946), *Instructor in Pediatrics.*

FELLOWS

Abdul-Aziz Asadi, M.D. (Duke, 1958), *Fellow in Pediatric Endocrinology.*

John P. Boineau, M.D. (Duke, 1959), *Fellow in Pediatric Cardiology.*

Paul C. Horn, M.D. (Jefferson Medical College, 1956), *Fellow in Pediatric Allergy.*

Elizabeth A. Lamb, M.D. (Univ. of Tennessee, 1958), *Fellow in Pediatric Endocrinology and Instructor in Pediatrics.*

Lorna G. Macdougall, M.D. (Glasgow Univ., 1947), *Fellow in Pediatric Hematology and Instructor in Pediatrics.*

Nelle Strozier Moseley, M.D. (Med. Coll. of Georgia, 1957), *Fellow in Pediatric Endocrinology and Instructor in Pediatrics.*

Aysel Pirnar, M.D. (Ankara Univ. Med. School, 1960), *Fellow in Pediatric Hematology.*

RESIDENTS

James O. Morphis, Jr., M.D. (Duke, 1958), *Chief Resident.*

Thomas H. Albertson, M.D. (Duke, 1959), *Clinic Resident.*

Robert E. Rider, M.D. (Duke, 1961), *Clinic Resident.*

SENIOR RESIDENTS

Mary Jane L. Nye, M.D. (Duke, 1961).

Joseph B. Warshaw, M.D. (Duke, 1961).

ASSISTANT RESIDENTS

C. Lee Gilliatt, Jr., M.D. (Harvard, 1962).

Deborah W. Kredich, M.D. (Univ. of Michigan, 1962).

*Charles H. Von Canon, M.D. (Univ. of Tennessee, Dec. 1962).

Margaret J. Willhide, M.D. (Med. Coll. of Virginia, 1962).

Robert L. Young, M.D. (Duke, 1961).

JUNIOR ASSISTANT RESIDENT

*William B. Waddell, M.D. (Duke, 1962).

INTERNS

Charles P. Ayers, M.D. (Duke, 1963).

Mahmound H. Bahrani, M.D. (Univ. of Baghdad, 1961).

Peter G. Burch, M.D. (Johns Hopkins, 1963).

*John H. Hall, M.D. (Duke, Dec. 1963).

J. Owen Hendley, M.D. (Univ. of Pennsylvania, 1963).

John R. Hogg, M.D. (Med. Coll. of Virginia, 1963).

Alvin Jaffee, M.D. (Emory, 1963).

*Kay R. Lewis, M.D. (Duke, Dec. 1963).

Avron V. Maletzky, M.D. (Columbia Univ. Coll. of P & S, 1963).

M. Henderson Rourk, M.D. (Univ. of Pennsylvania, 1963).

Sanford Schneider, M.D. (New York Univ., 1963).

First-year medical students receive twenty hours instruction in normal growth and development and in patterns of behavior. There

* Beginning January 1, 1964.

is a nine weeks course in pediatrics during the junior or senior year, the time being equally divided between clinic and ward services. Students participate in the morning subspecialty clinics, the well baby clinics and afternoon general medical pediatric clinics, seeing both new and return patients. Each week a one hours conference is held at the end of the following specialty clinics: hematology, metabolism, neurology, cardio-renal, allergy, convulsive disorders, behavior problems, endocrinology and well baby care. Each afternoon, there is a one hour conference in the general pediatric clinic with informal presentation and discussion of patients. On the wards, the students assist as clinical clerks and are assigned patients in rotation. They make daily rounds with the staff. Pediatric nursing procedures are demonstrated by the nursing supervisor. The different subspecialty groups—cardiology, hematology, allergy, endocrinology, dematology, metabolism—make ward rounds weekly. A joint conference with the senior and resident staff is held twice weekly on topics of pediatric interest, clinicopathologic discussions, case presentation and for guest lecturers. There is a weekly radiology conference at which the interesting cases of the week are presented and discussed with the radiologist. Each student prepares a paper on a pediatric subject of his own choosing which they present to the entire group in an informal discussion.

In addition to the ten pediatric first year residencies, there are four in which six months each are spent in obstetrics and pediatrics for graduates who plan to enter general practice. Six second-year, four third-year, and two chief residencies are available.

## *Physiology and Pharmacology*

Daniel C. Tosteson, M.D. (Harvard, 1949), *Professor of Physiology and Chairman of the Department and Chief of the Laboratory of Cellular Transport Processes.*

Eugene M. Renkin, Ph.D., (Harvard, 1951), B.S. (Tufts, 1948), *Professor of Pharmacology and Head of the Division of Pharmacology, and Chief of the Laboratory of Regulatory Pharmacology.*

Frederick Bernheim, Ph.D. (Cambridge, 1928), *Professor of Pharmacology and Chief of the Laboratory of Biochemical Pharmacology.*

George S. Eadie, M.D. (Toronto, 1921), Ph.D. (Cambridge, 1927), *Professor Emeritus of Physiology and Pharmacology.*

Frank G. Hall, Ph.D. (Wisconsin, 1923), *Professor of Physiology.*

Edward V. Evarts, M.D. (Harvard, 1948), *Visiting Professor of Physiology.*

Jacob J. Blum, Ph.D. (University of Chicago, 1952), *Associate Professor of Physiology, and Chief of the Laboratory of Molecular Physiology.*

William E. DeTurk, Ph.D. (Duke, 1940), M.D. (Vanderbilt, 1948), *Associate Professor of Pharmacology.*

Paul Horowicz, Ph.D. (Johns Hopkins, 1955), *Associate Professor of Physiology, and Chief of the Laboratory of Muscle Physiology.*

Wayland E. Hull, Ph.D. (Duke, 1950), *Associate Professor of Physiology, and Chief of the Laboratory of Cardiopulmonary Physiology.*

Edward A. Johnson, M.D., Ch.B. (University of Sheffield, 1950), M.D. *(University of Sheffield, 1953), Associate Professor of Pharmacology and Chief of the Laboratory of Cardiac Pharmacology.*

Jack L. Kostyo, Ph.D. (Cornell, 1957), *Associate Professor of Physiology and Chief of the Laboratory of Cellular Endocrinology.*

E. Croft Long, M.D., B.S., Ph.D. (London, 1952 and 1957) *Associate Professor of Physiology and Associate in Pediatrics.*

John W. Moore, Ph.D. (Virginia, 1945), *Associate Professor of Physiology and Chief of the Laboratory of Cellular Neurophysiology.*

Bodil Schmidt-Nielsen, Ph.D. (Copenhagen, 1955), *Research Associate Professor of Physiology and Zoology.*

Saul Boyarsky, B.S. (University of Vermont, 1943), M.D. (University of Vermont, 1946), *Assistant Professor of Physiology and Professor of Urology.*

Macdonald Dick, M.D. (Johns Hopkins, 1928), *Assistant Professor of Physiology and Pharmacology and Associate in Medicine.*

Donald D. Greenwood, B.A. (University of Wisconsin, 1951), Ph.D. (Harvard, 1960), *Assistant Professor of Physiology, Assistant Professor of Otolaryngology and Assistant Professor of Psychology.*

Paul Hochstein, B.S. (Rutgers University, 1950), M.S. (University of Maryland, 1952), Ph.D. (University of Maryland, 1954), *Assistant Professor of Pharmacology and Research Assistant in Medicine.*

Thomas J. McManus, M.D. (Boston, 1955), *Assistant Professor of Physiology.*

William C. North, M.D. (Northwestern University, 1950), *Assistant Professor of Pharmacology and Assistant Professor of Anesthesiology.*

Athos B. Ottolenghi, M.D. (Pavia, Italy, 1946) *Assistant Professor of Pharmacology.*

John V. Salzano, Ph.D. (Iowa, 1956), *Assistant Professor of Physiology.*

George G. Somjen, M.D. (University of New Zealand, 1961), *Assistant Professor of Physiology and Chief of the Laboratory of Intergrative Neurophysiology.*

Robert Stempfel, Jr., M.D. (Vanderbilt University, 1952), *Assistant Professor of Physiology and Associate Professor of Pediatrics.*

Carl J. Gerber, Ph.D. (Washington University, 1960), *Associate in Physiology.*

Ralph J. Gorten, B.A. (Western Maryland College, 1951), M.D. (University of Pennsylvania, 1955), *Associate in Physiology and Chief, Radioisotope, V. A. Hospital.*

Barbara Z. Renkin, B.A. (Bucknell University, 1952), M.A. (Mount Holyoke, 1954), Ph.D. (Johns Hopkins, 1959), *Associate in Physiology.*

Howard K. Thompson, Jr., M.D. (Columbia College of Physicians and Surgeons, 1953), *Associate in Physiology and Associate in Medicine.*

Robert W. Blount, A.B. (University of Los Angeles, 1951), Ph.D. (University of Los Angeles, 1957), *Research Associate in Physiology.*

Brian A. Curtis, B.A. (University of Rochester, 1958), Ph.D. (Rockefeller Institute, 1963), *Research Associate in Physiology.*

Varda Kahn, B.S. (University of Illinois, 1956), M.S. (University of Illinois, 1957), Ph.D. (University of Illinois, 1959), *Research Associate in Physiology.*

Glen Gale, Ph.D. (Duke, 1953), *Instructor in Pharmacology.*

Jacqueline C. Hijmans, M.D. (State University of Leyden, 1951), *Instructor in Physiology and Instructor in Medicine.*

Barbara Rayner, B.A. (Mount Holyoke, 1949), *Instructor in Physiology.*

Edward M. Harris, *Chief, Electronics Shop.*

Howard B. Langley, *Technical Associate in Physiology.*

The course in medical physiology is given during the first year. There are lectures, laboratories and conferences each week in which

are presented the general principals of human physiology and their general application to the practice of medicine. The course consists of two parts. The intention of Part I is to identify that core of information about physiology which all medical students will need no matter which of the many careers in medicine and the medical sciences they may choose. Part II seeks to provide an opportunity for the medical students to explore in depth some facet of physiology.

The course in pharmacology is taught in the Spring of the second year. Lectures, laboratories and conferences deal with the mode of action of drugs in terms of biochemical and physiological processes.

*Physiologic and Pharmacologic Research.* The facilities of the department include modern types of research equipment. There are special facilities for research in the fields of respiration, high altitude physiology, circulation, endocrinology, cellular transport processes and metabolism, cellular neurophysiology, muscle physiology and molecular physiology. Properly qualified students are encouraged to undertake original research in physiology and pharmacology under direction of various members of the staff.

*Seminars.* Each fall term a seminar for graduate students in physiology is conducted by the staff.

*Courses in Advanced Physiology.* During the fall term, a series of two-hour lecture and seminar courses in certain aspects of advanced physiology are given for qualified students and post-doctoral fellows. These courses, noted below, are given in alternate years.

Topics in Pulmonary and Cardiovascular Physiology.
Cellular Endocrinology.
Physiology of Excitable Cells.
Cellular Transport Processes.
Molecular Physiology.

*Training in the Use of Radioactive Isotopes in Physiological Research.* The course in physiology for first year students will include considerable emphasis on the handling and experimental use of radioactive isotopes.

## *Preventive Medicine*

David T. Smith, M.D. (Johns Hopkkins, 1922), *Professor and Chairman of Preventive Medicine and James B. Duke Professor of Microbiology.*

William J. A. DeMaria, M.D. (Duke, 1948), *Professor of Preventive Medicine and Associate Professor of Pediatrics.*

Elbert L. Persons, M.D. (Harvard, 1927), *Associate Professor of Preventive Medicine, Professor of Medicine and Director of Student Health.*

Dorothy Naumann, M.D. (Syracuse, 1940), *Associate in Preventive Medicine, Associate Director of Student Health.*

Conrad M. Knight, B.S. (Norwich University, 1953), *Associate in Preventive Medicine, Health Physicist.*

Mac Roy Gasque, M.D. (Virginia, 1944), *Visiting Lecturer in Preventive Medicine; Medical Director, Olin Mathison Co.*

*Preventive Medicine.* In the second year there is a series of lectures given to provide some basic orientation predicated upon the fact that disease has a community as well as a personal aspect and that the social component of illness is an important force in the work of the doctor as well as in the life of the community. The methods and goals of preventive medicine are illustrated and discussed in relation to specific diseases. The student is oriented in the methods of public health administration with particular emphasis on the role played by practicing physician. The problems involved in the collection of vital statistics and the methods of epidemiology are considered. Special attention is given to the factors involved in providing medical care to the community. The physician's role in legal and industrial medicine is also considered. The course is designed primarily to give the student a point of view which he may incorporate in his future activities in clinical medicine.

## *Psychiatry*

Ewald W. Busse, M.D. (Washington Univ., 1942), *Professor of Psychiatry and Chairman of the Department.*

Irving E. Alexander, Ph.D. (Princeton, 1949), *Professor of Medical Psychology; Professor of Psychology.*

Kurt W. Back, Ph.D. (Massachusetts Institute of Tech., 1949), *Professor of Medical Sociology; Professor of Sociology.*

Bernard Bressler, M.D. (Washington Univ., 1942), *Professor of Psychiatry.*

Bingham Dai, Ph.D. (Chicago, 1935), *Professor of Mental Hygiene; Professor of Psychology.*

John A. Fowler, M.D. (Bowman Gray, 1946), *Professor of Psychiatry and Assistant Professor of Pediatrics.*

Leslie B. Hohman, M.D. (Johns Hopkins, 1917), *Professor Emeritus of Psychiatry and Consultant in Psychiatry; Assistant Professor of Pediatrics.**

Hans Lowenbach, M.D. (Hamburg, 1929), *Professor of Psychiatry and Assistant Professor of Pediatrics.*

George L. Maddox, Jr., Ph.D. (Michigan State Univ., 1956), *Professor of Medical Sociology; Professor of Sociology.*

John C. McKinney, Ph.D. (Michigan State, 1953), *Professor of Medical Sociology; Professor of Sociology and Chairman, Department of Sociology.*

Walter D. Obrist, Ph.D. (Northwestern, 1950), *Professor of Medical Psychology; Assistant Professor of Psychology.*

John M. Rhoads, M.D. (Temple, 1943), *Professor of Psychiatry.*

William P. Wilson, M.D. (Duke, 1947), *Professor of Psychiatry.*

John C. Altrocchi, Ph.D. (California, 1957), *Associate Professor of Medical Psychology; Assistant Professor of Psychology.*

*** Retired August 30, 1960.**

Lloyd J. Borstelmann, Ph.D. (California, 1950), *Associate Professor of Medical Psychology; Associate Professor of Psychology.*

Robert C. Carson, Ph.D. (Northwestern, 1957), *Associate Professor of Medical Psychology; Assistant Professor of Psychology.*

Virginia L. Clower, M.D. (Tulane, 1944), *Associate Professor of Psychiatry.*

Sanford I. Cohen, M.D. (Chicago Medical Coll., 1952), *Associate Professor of Psychiatry.*

Robert H. Dovenmuehle, M.D. (St. Louis, 1948), *Associate Professor of Psychiatry.*

Ila H. Gehman, Ed.D. (Pa. State, 1947), *Associate Professor of Medical Psychology; Lecturer in Psychology.*

Robert L. Green, Jr., M.D. (Hahnemann, 1946), *Associate Professor of Psychiatry.*

Harold J. Harris, M.D. (Long Island Coll. of Med., 1949), *Associate Professor of Psychiatry and Assistant Professor of Pediatrics.*

Frederick R. Hine, M.D. (Yale, 1949), *Associate Professor of Psychiatry.*

Martin Lakin, Ph.D. (Chicago, 1955), *Associate Professor of Medical Psychology; Assistant Professor of Psychology.*

Charles E. Llewellyn, Jr., M.D. (Med. Coll. of Va., 1946), *Associate Professor of Psychiatry.*

Jack J. Preiss, Ph.D. (Michigan State, 1954), *Associate Professor of Medical Sociology; Associate Professor of Sociology.*

Barry M. Shmavonian, Ph.D. (Univ. of Washington, 1957), *Associate Professor of Medical Psychology; Lecturer in Psychology.*

George A. Silver, M.D. (Duke, 1938), *Associate Professor of Psychiatry.*

Herbert F. Crovitz, Ph.D. (Duke, 1960), *Assistant Professor of Medical Psychology; Lecturer in Psychology.*

Carl Eisdorfer, Ph.D. (New York, 1959), *Assistant Professor of Medical Psychology; Lecturer in Psychology.*

Peter L. Hein, Jr., M.D. (Geo. Washington, 1955), *Assistant Professor of Psychiatry.*

Mary M. Huse, Ph.D. (Duke, 1959), *Assistant Professor of Medical Psychology; Lecturer in Psychology.*

J. David Jones, M.D. (Duke, 1954), *Assistant Professor of Psychiatry and Associate in Pediatrics.*

Charles R. Keith, M.D. (Kansas Univ., 1957), *Assistant Professor of Psychiatry.*

Arnold D. Krugman, Ph.D. (Univ. of Kentucky, 1952), *Assistant Professor of Medical Psychology.*

Maurine B. LaBarre, M.S.W. (Bryn Mawr, 1934), *Assistant Professor of Psychiatric Social Work.*

W. Edward McGough, M.D. (Duke, 1956), *Assistant Professor of Psychiatry.*

Claude R. Nichols, Jr., M.D. (Baylor, 1946), *Assistant Professor of Psychiatry.*

John B. Reckless, M.B. (Ch.) B. (Univ. of Birmingham, England), *Assistant Professor of Psychiatry.*

Robert E. Smith, M.D. (N.Y. Med. Coll., 1954), *Assistant Professor of Psychiatry; Assistant Professor of Pastoral Care and Psychiatric Counseling.*

Wilford W. Spradlin, M.D. (Virginia, 1957), *Assistant Professor of Psychiatry.*

Larry R. Thompson, Ph.D. (Florida State, 1961), *Assistant Professor of Medical Psychology; Lecturer in Psychology.*

Donald J. Stedman, Ph.D. (Geo. Peabody, Coll., 1962), *Assistant Professor of Medical Psychology.*

Russell F. Tomlinson, Ph.D. (Florida, 1957), *Assistant Professor of Medical Psychology.*

Adriaan Verwoerdt, M.D. (Amsterdam, 1952), *Assistant Professor of Psychiatry.*

Martha L. Wertz, M.S.W. (Tulane Univ. School of Social Work, 1952), *Assistant Professor of Psychiatric Social Work.*

Donald K. Adams, Ph.D. (Yale, 1927), *Consultant; Professor of Psychology.*

Weston LaBarre, Ph.D. (Yale, 1937), *Consultant; Professor of Anthropology.*

Mary C. Sumner, B.A. (Tulane, 1917), *Consultant in Psychiatric Social Work.*

Janet Allen, M.S.S. (Smith College for Social Work, 1951), *Associate in Psychiatric Social Work.*

Alfred Dean, M.A. (Univ. of N.C., 1958), *Associate in Medical Sociology; Lecturer in Sociology.*

Ben W. Feather, M.D. (Geo. Washington, 1956), *Associate in Psychiatry.*

Frances C. Jeffers, M.A. (Columbia, 1945), *Research Associate in Psychiatry.*

Muriel J. McLauchlin, M.S.W. (Pa. School of Social Work, 1937), *Research Associate in Psychiatric Social Work.*

Charles W. Neville, Jr., M.D. (Vanderbilt, 1956), *Associate in Psychiatry.*

Alan M. Rochlin, Ph.D. (Duke, 1954), *Associate in Medical Psychology.*

G. Martin Amacher, M.S.W. (Tulane Univ. School of Social Work, 1961), *Instructor in Psychiatric Social Work.*

Elaine K. Crovitz, Ph.D. (Duke, 1964), *Instructor in Medical Psychology.*

John L. Hughes, M.D. (Med. Coll. of Ga., 1959), *Instructor in Psychiatry.*

Pedro J. Irigaray, M.D. (Mexico, 1955), *Instructor in Psychiatry and Fellow in Psychiatric Research.*

Larry R. Kroner, M.D. (Geo. Washington, 1955), *Instructor in Psychiatry.*

Herman L. Lineberger, M.D. (Univ. of N.C., 1954), *Instructor in Psychiatry.*

Anna M. MacLauchlin, M.S.S. (Smith Coll. School for Social Work, 1959), *Instructor in Psychiatric Social Work.*

Barbara A. Pope, M.S.S.W. (Richmond Prof. Institute of Social Work, 1953), *Instructor in Psychiatric Social Work.*

Jacqueline R. Stackhouse, M.S.S. (Smith Coll. School for Social Work, 1958), *Instructor in Psychiatric Social Work.*

Dorothy K. Heyman, M.S.W. (Pa. School of Social Work, 1940), *Assistant in Psychiatric Social Work.*

Carolyn B. Richards, M.S. (Univ. of Miami, 1961), *Assistant in Medical Psychology.*

### STAFF, HIGHLAND HOSPITAL, ASHEVILLE, N. C.

Marie Baldwin, M.D. (South Carolina, 1929), *Associate in Psychiatry.*

Joseph W. Coxe, M.D. (Univ. of Va., 1942), *Associate in Psychiatry.*

Robert L. Craig, M.D. (Johns Hopkins, 1935), *Associate in Psychiatry and Medical Director.*

Elizabeth Harkins, M.S.W. (Univ. of Pittsburgh, 1938), *Psychiatric Social Worker.*

Alice Jackson, M.S.W. (Western Reserve Univ., 1954), *Psychiatric Social Worker.*

John D. Patton, M.D. (St. Louis, 1945), *Associate in Psychiatry and Clinical Director.*

Anne E. Sagberg, M.D. (Oslo, 1947), *Associate in Psychiatry.*

Donald R. Boone, M.S.W. (Florida State, 1960), *Psychiatric Social Worker.*

Norman A. Polansky, Ph.D. (Michigan, 1951), *Director of Social Service and Clinical Psychologist.*

### FELLOW IN PSYCHIATRY

Prescott A. Walker, M.D. (Med. Coll. of S.C., 1959).

### RESIDENTS IN PSYCHIATRY

Morton Beiser, M.D. (British Columbia, 1960), Chief Resident.

William B. Anderson, M.D. (Univ. of Minnesota, 1948).

William D. Clarkson, M.D. (Med. Coll. of S.C., 1958).

Norbert B. Enzer, M.D. (McGill, 1956).

Charles W. Erwin, M.D. (Texas, 1960).
Donald R. Fowler, M.D. (Southwestern, 1961).
David A. Frieske, M.D. (Washington Univ., 1961).
Daniel T. Gianturco, M.D. (Buffalo, 1960).
James A. Hall, M.D. (Southwestern, 1961).
Ralph M. Klopper, M.D. (Univ. of Missouri, 1961).
Virginia L. Moreland, M.D. (Univ. of Ill., 1950).
Edward L. Reilly, M.D. (Seton Hall Coll. of Med., 1961).
Robert H. Sauer, M.D. (Buffalo, 1960).
Peter P. E. Schuntermann, M.D. (Univ. of Hamburg, Germany, 1958).
William M. Taylor, M.D. (Med. Coll. of Va., 1959).
William J. Van Veen, M.D. (Seton Hall Coll. of Med., 1960).
Samuel N. Workman, M.D. (Med. Coll. of S.C., 1960).

ASSISTANT RESIDENTS IN PSYCHIATRY

Gilbert H. Berken, M.D. (Univ. of Miami, 1963).
Richard B. Boren, III, M.D. (Duke, 1953).
Sherrill A. Conna, M.D. (Duke, 1962).
Robert A. Doyle, M.D. (Duke, 1963).
Kenneth H. Draper, M.D. (Univ. of Rochester, 1960).
James L. Elmore, M.D. (Univ. of Tenn., 1961).
Richard A. Liguori, M.D. (Duke, 1963).
James D. Mallory, Jr., M.D. (Duke, 1958).
Jesse N. McNiel, M.D. (Univ. of Ark., 1960).
Albert W. Moser, M.D. (Med. Coll. of Va., 1956).
Albert H. Powell, Jr., M.D. (Duke, 1957).
James C. Repass, M.D. (Med. Coll. of Va., 1961).
Marvin J. Short, II, M.D. (Duke, 1962).
Gilbert Silverman, M.D. (Univ. of Bern, Switzerland, 1960).
Michael R. Sottarelli, M.D. (Seton Hall Coll. of Med., 1963).
Otho Lee Trick, M.D. (Indiana Univ., 1958).
William K. Zung, M.D. (Texas, 1961).

PSYCHOLOGY INTERNS IN THE DEPARTMENT OF PSYCHIATRY

Audrey Melman, B.A. (Brandeis Univ., 1962).
Margaret F. Nicholls, B.A. (Duke, 1961).
David Sandler, B.A. (Brooklyn Coll., 1960).
J. Sidney Shrauger, B.A. (Montana St. Univ., 1960).

The objectives of the undergraduate teaching program in the Department of Psychiatry are: (a) to bring to the medical student the basic information which he requires to comprehend his role in the community as a physician, to understand his relationship with patients, to appreciate the impact of disease upon the patient, and to understand the influence of the psychic processes upon the behavior and physiological functioning of the patient; (b) to provide the student with the knowledge of interviewing techniques and psychotherapeutic skills which can be utilized in the general practice of medicine.

Instruction begins in the first year. Approximately 76 hours are devoted to personality development, maturing and aging, and the effect of the environment upon the individual. Teaching methods include lectures, the clinical demonstration of normal children, adults and patients, and small group discussions. During the second year, psychiatric concepts are presented which consider in some detail the topography of the mind, the common mental mechanisms, the concept of the unconscious, and the effects of these various factors on disease. Interviewing techniques are given considerable attention, and the student is given his first opportunity to observe and work with patients. In the third year, the student is assigned for a nine-week period to the Inpatient Service and to the Psychosomatic Service of the Department of Psychiatry. During this time, he has an opportunity to come in contact with patients who have a wide variety of emotional disorders. Emphasis is placed upon recognition and treatment of mental disturbances and the proper referral of seriously disturbed patients. During the senior year, the student, under close supervision, conducts psychotherapeutic interviews and observes the psychotherapeutic efforts of a senior psychiatrist. One afternoon a week is allotted throughout the year for this purpose.

Specialty training in the field of Psychiatry is offered professionally qualified physicians who have completed at least one year of internship. Completion of such training meets the requirements of the American Board of Psychiatry and Neurology. The major areas of residency training are the Psychiatric Inpatient Service, the Adult Outpatient Clinic, Psychosomatic Medicine, and the Durham Child Guidance Clinic.

## *Radiology*

Robert J. Reeves, M.D. (Baylor, 1924), *Professor of Radiology and Chairman of the Department.*

George Jay Baylin, M.D. (Duke, 1937), *Professor of Radiology.*

William Francis Barry, Jr., M.D. (Pennsylvania, 1946), *Associate Professor of Radiology.*

Patrick J. Cavanaugh, M.D. (St. Louis, 1951), *Associate Professor of Radiology in Charge of Division of Radiation Therapy.*

Boyd Thomas Worde, M.D. (Tennessee, 1947), *Associate Professor of Radiology.*

John Ashley Goree, M.D. (Duke, 1955), *Assistant Professor of Radiology.*

M. Paul Capp, M.D. (U.N.C., 1958), *Assistant Professor of Radiology.*

Johan P. Bonk, M.D. (Univ. of Utrecht, The Netherlands, 1949), *Associate Professor of Radiology, Chief of Service, Durham V.A. Hospital.*

Kim, Seuk Ky, M.D. (Severance Medical College), (Seoul, Korea, 1950), *Assistant Professor of Radiology, Associate Chief of Service, Durham V.A. Hospital.*

Clyde V. Alexander, Jr., M.D. (Duke, 1959), *Associate in Radiology.*

Aaron P. Sanders, M.S. (Rochester, 1952), *Assistant Professor of Radiology, Scientific Director of Isotope Laboratory Physicist.*

Alice L. McCrea, M.S. (Univ. of Chicago, 1958), *Assistant Professor of Radiology and Radiation Physicist.*

John B. Cahoon, R.T., F.A.S.X.T., *Assistant Professor of Radiologic Technology.*

VISITING STAFF

William Sprunt, M.D. (Harvard, 1945), *Assistant Professor of Radiology, Chief, Department of Radiology, Wake County Memorial Hospital.*

Owen W. Doyle, M.D. (Yale, 1947), *Associate Professor of Radiology.*

John F. Sherrill, Jr., M.D. (Bowman Gray, 1946), *Assistant Professor of Radiology, Chief, Radiology Watts Hospital.*

Guy W. Schlaseman, M.D. (Duke, 1946), *Assistant Professor of Radiology.*

Donald Monson, M.D. (Univ. of Wisconsin Med. School, 1955), *Associate in Radiology.*

Thomas G. Thurston, M.D. (Harvard, 1941), *Associate in Radiology.*

John Edmond Wear, M.D. (Alabama, 1945), *Associate in Radiology.*

Simmons Isler Patrick, M.D. (Duke, 1951), *Associate in Radiology.*

Cyrus L. Gray, M.D. (Duke, 1937), *Associate in Radiology.*

RESIDENTS

James K. Davis, M.D. (Duke, 1960).

Richard Dean Tester, M.D. (Med. Coll. Va., 1958).

Charles P. Winkler, M.D. (Med. Coll., Va., 1955).

William B. Davis, Jr., M.D. (Univ. Pa., 1957).

James W. Gibson, Jr., M.D. (Univ. of Tenn., 1957).

Tugrul Pirnar, M.D. (Ankara Univ., Turkey, 1959).

Addison G. Mangum, M.D. (UNC, 1958).

Charles W. George, M.D. (Univ. Tenn., 1958).

Clarence S. Davis, Jr., M.D. (Med. Coll. S.C., 1961).

Philip Howerton, M.D. (Duke, 1958).

Charles Edwin Carter, M.D. (Duke, 1962).

Honoratio H. Piedad (Far Eastern Univ., Manila, Philippines, 1959).

Robert G. Bradbury, M.D. (Med. Coll. S.C., 1958).

Raymond L. Thomas, M.D. (Duke, 1962).

Radiology teaching starts in the first year. During the course in anatomy, x-ray lectures are given. Radiologic discussions are presented to section groups. In the second year, student groups get further sectional training. An attempt is made to acquaint the student with the aids of roentgenology in diagnostic problems. The correct use of x-ray in diagnosis is stressed.

In 1960 the Radiation Therapy Wing was completed. This is a 16 room addition to the Department of Radiology and houses the entire radiation therapy, cancer teaching and cancer portion of the department. There are two supervoltage rooms; one with 3600 curie Cobalt 60 machine, the other with a Cesium 137 unit for head and neck, mouth and lip cancer. There is a 280 kilovolt conventional x-ray therapy machine. There is a superficial therapy x-ray machine. The radium unit is complete with housing facilities and working area for 1000 miligrams of radium or $Co_{60}$ equivalent. In addition to exam-

ining rooms and viewing rooms there is one large lecture hall in which tumor clinics and student conferences are held.

Therapeutic radiology is given each quarter in the senior year. Tumor clinics run throughout the year. At these sessions the general problem of the treatment of benign, inflammatory and malignant lesions by x-ray and radium is discussed, and accepted views of the combination of these therapeutic agents with surgery are emphasized. Representative cases are demonstrated, and the follow-up results are particularly stressed. The tumor clinic is active in all specialties.

A limited number of senior students are permitted to attend routine film reading sessions in the Department of Radiology. They are also instructed in the fundamentals of fluoroscopic examinations and shown the many pitfalls of the inexperienced fluoroscopist.

X-ray conferences are scheduled with each specialty in the X-ray Conference room with weekly schedules. All x-ray cases on the service of the preceding week are shown and briefly discussed for benefit of the house staff and attending students. Weekly conferences, including the Ear, Nose and Throat, Orthopaedics, Neurosurgery, Thoracic surgery, Pediatrics, Cardiac, Gastro-intestinal, Urology, are held and used as part of the teaching program. Wednesday and Friday afternoons special x-ray conferences of x-ray pathology are held. X-ray pathology conference 5 to 6 P.M. each Wednesday afternoon in the autopsy room.

Each Wednesday evening a conference is held by the members of the x-ray staff and visiting radiologists. Difficult cases are brought up for discussion and diagnosis.

A regional x-ray conference is held the last Thursday in each month, alternating with the University of North Carolina.

## RADIOISOTOPE DIVISION

The Radioisotope Division of the department operates a clinical radioisotope laboratory which serves the medical staff with diagnostic and therapeutic procedures done with radioisotopes and labeled compounds. At the present time a total of 35 procedures are available; 23 quantitatvie tracer tests, 7 scanning techniques and 5 therapeutic procedures. They are listed in a laboratory manual. Their number is continuously growing. In addition there are several major research projects actively under investigation. They cover studies of regional flow and distribution of blood, of renal function, of gastrointestinal absorption, of effects of chemotherapeutic agents, cellular physiology and radiation biology, and dosimetry of systemic internal radiation by whole body counting and scanning. The teaching program of the division includes post graduate training of resident physicians in medical uses of radioisotopes which is obligatory for residents in Radiology, elective for residents in other specialities (three months in

service training). In addition accelerated courses for outside physicians interested in obtaining AEC licenses for the diagnostic use of radioisotopes are given. Medical students are taught the medical applications of radioisotopes techniques on an elective basis. The board certified training of technicians is described in the chapter entitled "Radioisotope Technology."

## *Surgery*

Clarence E. Gardner, Jr., M.D. (Johns Hopkins, 1928), *Professor of Surgery and Chairman of the Department.*

Deryl Hart, M.D. (Johns Hopkins, 1921), *Professor of Surgery and President Emeritus of Duke University.*

Barnes Woodhall, M.D. (Johns Hopkins, 1930), *Professor of Neurosurgery; Dean of the School of Medicine and Vice-Provost in Charge of Medical Affairs.*

William G. Anlyan, M.D. (Yale, 1949), *Professor of Surgery and Associate Dean of the School of Medicine.*

Edwin P. Alyea, M.D. (Johns Hopkins, 1923), *Professor of Urology and Emeritus Chief of the Division of Urologic Surgery.*

W. Banks Anderson, M.D. (Johns Hopkins, 1924), *Professor of Ophthalmology and Chief of the Division of Ophthalmology.*

Lenox D. Baker, M.D. (Duke, 1933), *Professor of Orthopaedic Surgery and Chief of the Division of Orthopaedic Surgery.*

Joseph W. Beard, M.D. (Vanderbilt, 1929), *James B. Duke Professor of Surgery in Charge of Experimental Surgery and Associate Professor of Virology.*

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Ivan W. Brown, Jr., M.D. (Duke, 1940), *Professor of Surgery.*

John E. Dees, M.D. (Virginia, 1933), *Professor of Urology.*

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J. Leonard Goldner, M.D. (Nebraska, 1943), *Professor of Orthopaedic Surgery.*

Keith S. Grimson, M.D. (Rush Med. Coll., 1933), *Professor of Surgery.*

Guy L. Odom, M.D. (Tulane, 1933), *Professor of Neurosurgery and Chief of the Division of Neurosurgery.*

Kenneth L. Pickrell, M.D. (Johns Hopkins, 1935), *Professor of Plastic and Maxillofacial Surgery and Chief of the Division of Plastic and Maxillofacial Surgery.*

Raymond W. Postlethwait, M.D. (Duke, 1937), *Professor of Surgery; Chief of Surgical Service, Durham V.A. Hospital.*

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Frank W. Clippinger, M.D. (Washington University, 1952), *Associate Professor of Orthopaedic Surgery.*

Marcus L. Dillon, M.D. (Duke, 1948), *Associate Professor of Surgery; Assistant Chief of Surgical Service, Durham V.A. Hospital.*

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William R. Hudson, M.D. (Bowman Gray, 1951), *Associate Professor of Otolaryngology and Chief of the Division of Otolaryngology.*

William C. North, M.D. (Northwestern, 1950), *Associate Professor of Anesthesiology and Associate Professor of Pharmacology.*

William P. J. Peete, M.D. (Harvard, 1947), *Associate Professor of Surgery.*

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Frank H. Bassett, III, M.D. (Louisville, 1957), *Assistant Professor of Orthopaedic Surgery and Associate in Anatomy.*

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Norman Kirshner, Ph.D. (Pennsylvania State, 1952), *Assistant Professor of Experimental Surgery and Assistant Professor of Biochemistry.*

George B. Ferguson, M.D. (Jefferson, 1932), *Assistant Professor of Endoscopy and Laryngology.*

Donald D. Greenwood, Ph.D. (Harvard, 1960), *Assistant Professor of Otolaryngology; Assistant Professor of Physiology and Assistant Professor of Psychology.*

Maurice Alan Lesage, M.D. (Paris, France, 1949), *Assistant Professor of Experimental Surgery.*

Donald E. McCollum, M.D. (Bowman Gray, 1953), *Assistant Professor of Orthopaedic Surgery.*

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Nathan Schupper, D.D.S. (Pittsburgh, 1932), *Associate in Dentistry; Assistant Chief of Dental Service, Durham V.A. Hospital.*

Ralph E. Snider, D.D.S. (Ohio State, 1948), *Associate in Dentistry; Staff Dentist of Dental Service, Durham V.A. Hospital.*

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Christoph Landschuetz, M.D. (University of Heidelberg, 1949), *Research Associate in Experimental Surgery.*

Peregrina C. Labay, M.D. (University of St. Thomas, 1954), *Research Associate in Urologic Surgery.*

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Marguerite Alberta Thiele, A.B. (Duke, 1944), *Research Associate in Thoracic Surgery.*

Rosemarie B. Zischka, Ph.D. (University of Vienna, 1963), *Research Associate in Experimental Surgery.*

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Oscar L. Miller, M.D. (Emory, 1912), *Lecturer in Orthopaedics; Orthopaedic Surgeon, Charlotte Memorial Hospital, Charlotte, N.C.*

William McK. Roberts, M.D. (Tufts, 1925), *Lecturer in Orthopaedics; Surgeon-in-Chief, N.C. Orthopaedic Hospital, Gastonia, N.C.*

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Delos W. Boyer, M.D. (George Washington, 1950), *Instructor in Orthopaedics, Danville, Va.*

Mary B. Campbell, R.N. (St. Luke's, 1937), *Instructor in Anesthesiology and Chief Nurse Anesthetist.*

Gordon M. Carver, Jr., M.D. (Duke, 1947), *Instructor in Surgery.*

James E. Davis, M.D. (Pennsylvania, 1943), *Instructor in Surgery.*

James R. Fortune, B.S. (N.C. State, 1935), *Instructor in Audiology.*

Robert E. Musgrave, M.D. (Tennessee, 1946), *Instructor in Orthopaedics, Danville, Va.*

Carl N. Patterson, M.D. (Maryland, 1944), *Instructor in Otolaryngology.*

Eva O. Reese, R.N. (Duke, 1955), *Instructor in Perimetry.*

Larry Turner, M.D. (Duke, 1939), *Instructor in Ophthalmology.*

Shankar N. Kapoor, M.D. (King George's Med. Coll. Lucknow, India, 1935), *Assistant in Orthopaedics.*

Thomas C. Kerns, Jr., M.D. (Duke, 1950), *Assistant in Ophthalmology.*

## FELLOWS

Enrique Augusto Bonfils-Roberts, M.D. (University of Buenos Aires, Argentina, 1962), *Fellow in Thoracic Surgery.*

Sushil Lacy, M.D. (Christian Med. Coll. India, 1959), *Fellow in Surgery.*

Shusuke Ogino, M.D. (Yamaguchi Med. School, Japan, 1953), *Fellow in Thoracic Surgery.*

Takeshi Shimizu, M.D. (Nagoya University School of Medicine, Japan, 1957), *Fellow in Thoracic Surgery.*

## RESIDENTS

E. Everett Anderson, M.D. (Duke, 1958), *Resident and Instructor in Urologic Surgery.*

William E. Barnes, Jr., M.D. (Baylor, 1957), *Resident and Instructor in Plastic Surgery.*

Henry S. Campbell, M.D. (Duke, 1960), *Resident and Instructor in Ophthalmology.*

Horace B. Cupp, Jr., M.D. (Duke, 1955), *Resident and Instructor in Neurosurgery.*

Ernest M. Freedle, Jr., M.D. (Stanford, 1956), *Resident and Instructor in Orthopaedics.*

John W. Freese, M.D. (Johns Hopkins, 1957), *Resident and Instructor in Surgery.*

Brett B. Gutsche, M.D. (Rochester, 1961), *Resident and Instructor in Anesthesiology.*

O. James Hart, Jr., M.D. (North Carolina, 1959), *Resident and Instructor in Urologic Surgery.*

Thomas K. Howard, M.D. (Med. Coll. of S.C., 1954), *Resident and Instructor in Anesthesiology.*

L. Ronald Hurst, M.D. (Duke, 1957), *Resident and Instructor in Otolaryngology.*

Patrick D. Kenan, M.D. (Duke, 1959), *Resident and Instructor in Otolaryngology.*

Albin W. Johnson, M.D. (Duke, 1957), *Resident and Instructor in Ophthalmology.*

David S. Levenson, M.D. (Michigan, 1958), *Resident and Instructor in Ophthalmology.*

William J. Pitts, M.D. (Vanderbilt, 1954), *Resident and Instructor in Plastic Surgery.*

John W. Reeves, M.D. (Duke, 1955), *Resident and Instructor in Surgery.*

Donald Silver, M.D. (Duke, 1955), *Resident and Instructor in Surgery.*

## ASSISTANT RESIDENTS

Agustin Aguilar, M.D. (University Puebla, Mexico, 1953), *Assistant Resident in Anesthesiology.*

E. Warner Ahlgren, M.D. (Buffalo, 1962), *Assistant Resident in Anesthesiology.*

Edward L. Bradley, III, M.D. (Temple, 1962), *Assistant Resident in Surgery.*

David L. Brown, M.D. (N.Y. Med. Coll., 1959), *Assistant Resident in Anesthesiology.*

Lubin F. Bullard, M.D. (Duke, 1953), *Assistant Resident in Ophthalmology.*

William C. Butterfield, M.D. (Yale, 1959), *Assistant Resident and Instructor in Surgery.*

Gerald W. Cady, M.D. (Washington University, 1952), *Assistant Resident in Orthopaedics.*

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C. Porter Claxton, Jr., M.D. (Virginia, 1961), *Assistant Resident in Surgery.*

Clyde B. Cox, Jr., M.D. (Johns Hopkins, 1959), *Assistant Resident in Surgery.*

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Ronald F. Crown, M.D. (George Washington, 1962), *Assistant Resident in Surgery.*

William F. Deverell, M.D. (Buffalo, 1958), *Assistant Resident in Orthopaedics, Watts and Lincoln Hospitals.*

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Richard C. Estes, M.D. (Georgia, 1961), *Assistant Resident in Urologic Surgery.*

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Brack G. Hattler, Jr., M.D. (Cornell, 1961), *Assistant Resident in Surgery.*

Paul E. Henson, M.D. (Georgia, 1961), *Assistant Resident in Urologic Surgery.*

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Lowell M. Hill, M.D. (Stanford, 1960), *Assistant Resident in Orthopaedics and Fellow in Rheumatology.*

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Ivey Jacobs, M.D. (Med. Coll. of Ga., 1952), *Assistant Resident in Otolaryngology.*

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Calvin V. Morgan, Jr., M.D. (Duke, 1962), *Assistant Resident in Surgery.*

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Sigurd C. Sandzen, Jr., M.D. (Stritch, 1959), *Assistant Resident in Orthopaedics, Durham V.A. Hospital.*

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James W. Thompson, M.D. (Virginia, 1960), *Assistant Resident in Surgery.*

Lawrence K. Thompson, III, M.D. (Duke, 1961), *Assistant Resident in Surgery.*

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William T. Weaver, M.D. (Duke, 1958), *Assistant Resident and Instructor in Surgery.*

Wade S. Weems, M.D. (Duke, 1962), *Assistant Resident in Surgery.*

Robert H. Wilkins, M.D. (Pennsylvania, 1959), *Assistant Resident in Neurosurgery.*

Tolbert S. Wilkinson, M.D. (Duke, 1962), *Assistant Resident in Surgery.*

## INTERNS

Anthony Acinapura, M.D. (Georgetown, 1963), *Intern in Surgery.*

Timothy R. Altenhofen, M.D. (California, 1963), *Intern in Surgery.*

James E. Auer, M.D. (Iowa, 1963), *Intern in Surgery.*

John T. Bonner, M.D. (Chicago, 1963), *Intern in Surgery.*

Jesse A. Burnam, M.D. (North Carolina, 1963), *Intern in Surgery.*

Wallace H. Chang, M.D. (Duke, 1963), *Intern in Surgery.*

Norman Cooper, M.D. (Zurich, Switzerland, 1964), *Intern in Surgery.*

John I. Fishburne, Jr., M.D. (Med. Coll. of S.C., 1963), Intern in Surgery.

Warren H. Foer, M.D. (George Washington, 1963), *Intern in Surgery.*

Andrew J. Gabor, M.D. (Duke, 1964), *Intern in Surgery.*

Robert P. Goodman, M.D. (Vanderbilt, 1962), *Intern in Surgery.*
Richard J. Grayson, Jr., M.D. (Tulane, 1963), *Intern in Surgery.*
John N. Henry, M.D. (Vanderbilt, 1963), *Intern in Surgery.*
James W. Holsinger, M.D. (Duke, 1964), *Intern in Surgery.*
William B. Lehmann, M.D. (Yale, 1963), *Intern in Surgery.*
Louis H. McCraw, M.D. (Mississippi, 1963), *Intern in Surgery.*
George F. Schmitz, M.D. (Duke, 1964), *Intern in Surgery.*
John B. Sewell, Jr., M.D. (Vanderbilt, 1963), *Intern in Surgery.*

*General Surgery.* In the *second* year, the students attend lectures and demonstrations in surgical physical diagnosis which are integrated with the over-all course in Physical Diagnosis. They also have the opportunity to examine patients with surgical diseases under the supervision of a surgical instructor. In another phase of the second year surgical program, a four week course is given in "Emergency Surgery" under the auspices of the MEND program. Various aspects of traumatic surgery and simple life saving procedures are taught to each individual student on experimental animals under conditions closely simulating those in human surgery. The course includes a one day visit to Fort Bragg for a demonstration of the management of mass casualties. A two week course in radiation biology given by the Department of Radiology is integrated with the surgical program. The *junior* students, during their surgical quarter, are assigned to the wards as clinical clerks in general and thoracic surgery, plastic surgery and neurosurgery. During one half of the quarter, they are assigned to the wards at the V.A. Hospital. The students usually assist in the operative treatment of their patients. The surgical students in the *senior* year are assigned to all Surgical Clinics and, in addition, serve as clinical clerks working on the wards in Orthopaedics, Urology, Otolaryngology and Ophthalmology. In groups of two for the proportionate time available they are assigned in rotation to the operating room for Anesthesia and to the emergency division of the Out-Patient Clinic for experience in the diagnosis and care of urgent conditions.

*Anesthesiology Division.* Second year students are instructed in the fundamentals of anesthesia during operative procedures on animals. They also are given a practical demonstration of anesthetic drugs and techniques during the course in pharmacology. Third year students are given a series of lectures stressing cardiac arrest and resuscitation, oxygen therapy techniques and treatment of the patient in shock. Senior year students are given a ten day concentrated course of training in the practical administration of anesthetics, during which time they observe and administer anesthetics under the supervision of staff anesthesiologists.

*Neurosurgical Division.* During all four quarters, separate weekly ward rounds are held for the junior and senior surgical groups. Em-

phasis in these rounds is placed upon the recognition of neurosurgical problems, followed by observavtion of the operative and post-operative procedures. Weekly x-ray and pathological conferences are held, and these may be attended by interested individuals. Tumor clinic conferences are held bi-monthly, on each second and third Thursday of the month.

*Ophthalmologic Division.* Second-year students as a part of the course in physical diagnosis are instructed in the use and application of the ophthalmoscope, perimeter, and other diagnostic instruments commonly used in Ophthalmology. Fourth-year students are assigned for one week (39 hours) to the ophthalmic division where opportunity is provided for instruction in ophthalmic disease, in the treatment of ophthalmic emergencies, and in recognition of ophthalmic signs useful in the over-all evaluation of the patient in relation to systematic disease. Fourth-year students attend weekly rounds in medical ophthalmoscopy and neuro-ophthalmology during the surgical assignment. An elective is offered during the free period for students interested in ophthalmology.

*Orthopaedic Division.* During the surgical quarters the junior and senior students attend weekly rounds in orthopaedics and fractures. Students in their senior surgical quarter are assigned in rotation to the orthopaedic clinics. These students also attend all orthopaedic staff rounds, assist in orthopaedic operating rooms and attend the Journal Club meeting and all basic science lectures for the graduate students. An elective course in the treatment of fractures, limited to three students, is offered during the junior and senior surgical quarters. Also elective courses are offered in physical therapy and in cerebral palsy during these quarters. Children's orthopaedic scholarships for work at the North Carolina Orthopaedic Hospital are available during any quarter of the clinical years as are United Cerebral Palsy Scholarships at the North Carolina Cerebral Palsy Hospital. Arrangements may be made for the students who so desire to do research or experimental work. The students may also attend the state orthopaedic clinics.

*Otolaryngologic Division.* An introductory course of five hours' instruction in the use of otolaryngological instruments, with a review of normal anatomy, is given to second year students. Senior students in the surgical quarter are assigned for two weeks to the service, during which time they devote their duties to out-patient, ward work —both public and private, operating room and are available for all ward rounds. Nine hours of didactic lectures are given in the surgical quarter. A hearing-speech clinic has been initiated. Evaluation of hearing is being done with specialized equipment in sound-treated-

rooms. Time-consuming hearing tests, such as galvanic skin response, are done by special appointments.

*Physical Medicine and Rehabilitation Division:* First year student teaching consists of general orientation and combined lectures in functional anatomy. During the second year students are introduced to the use of electromyography and other electrodiagnostic tests in addition to physical diagnosis primarily of the musculo-skeletal system. Supplementary lectures covering a broad area are given during the third year in those divisions and departments with whom Physical Medicine and Rehabilitation closely cooperates. Third year students assigned to the Department of Surgery, Durham V.A. Hospital, receive didactic lectures weekly. An elective course is offered during the fourth year when students are familiarized with public and private resources and will work closely with paramedical personnel in the over-all therapy and discharge planning of severely disabled patients. Students are encouraged to attend the Rehabilitation Evaluation Clinic which meets twice monthly. Summer traineeship grants are available for interested students who have completed their second year of medical education.

*Plastic, Maxillofacial and Oral Surgery Division.* Didactic lectures and patient demonstrations are given to both the third and fourth year students to familiarize them with the basic principles of wound healing and repair, plastic, reconstructive and reparative procedures. Beside ward rounds, demonstrations are held twice weekly to illustrate the phenomena of trauma, disease and reconstruction. Third year students are assigned plastic surgery cases and patients and follow them from admission to the operating room and through convalescence until discharge from the hospital. Fourth year students work in the plastic surgery clinic which meets each afternoon, Monday through Friday, with special reference to Wednesday which is the plastic surgery and oncology return or follow-up day. Opportunity is afforded interested students to observe moulage, cast work, cosmetic restoration of color and the making of prosthetic appliances, etc. Associated closely and allied with the Division of Plastic Surgery are Oral Surgery, Medical Speech Pathology, and Orthodontics. Oral Surgery conducts ward and teaching rounds of particular interest to the junior students at Duke Hospital and at the V.A. Hospital. The Oral Surgery Clinic is in operation five and one-half days a week, and consultations and pre-and post-operative care of patients are conducted daily. Medical Speech Pathology will work in close cooperation with the Divisions of Plastic and Oral Surgery, Otolaryngology, Neurosurgery, Neurology, and Orthodontics, and the Departments of Pediatrics, Psychiatry and Medicine. Lectures are given to familiarize students with the various types of speech defects and abnor-

malities which are encountered in both children and adults. Pre- and post-operative cleft palate patients are seen and evaluated each Wednesday afternoon in conjunction with the plastic surgical clinic. A speech and hearing clinic is conducted each Tuesday in which children with speech and/or hearing defects are evaluated by a diagnostic team consisting of the pediatrician, otologist and speech pathologist. Clinics will be arranged as desired with other departments. Speech and hearing evaluation and speech and hearing therapy are given daily by appointment. Orthodontics attempts to cooperate with other divisions and departments in the Duke Medical Center for the treatment of dental malocclusions, acquired and congenital anomalies of the face and oral structures as well as the nasal and pharyngeal structures. Lectures are available to familiarize members in allied specialties and students with the growth and development processes of the head and face, general recognition of developing oral and facial defects, developing oral habits and the importance of preventing caries of the teeth and retention of teeth for the general health of the individual.

*Thoracic Surgical Division:* During the junior quarter, weekly rounds are held with particular attention paid to the relationship to preclinical sciences of the altered pulmonary, gastro-intestinal, and cardiovascular function as demonstrated by the patients. One hour each week a special x-ray conference conducted by one of the Professors of Radiology is held for the benefit of the student. Each patient on the service is discussed, his x-rays shown, and alterations in the radiologic picture by the particular disorder are discussed by the radiologist and members of the thoracic surgical staff. There is an additional conference one hour per week where the diagnosis, treatment and complications of each thoracic patient is discussed. During the senior quarter, a one hour lecture per week is held for the seniors, and during this period particular emphasis is placed on the diagnostic aspect of thoracic and cardiovascular disease. There is a follow-up thoracic and cardiovascular surgical clinic each Wednesday morning and the senior students participate in this follow-up.

*Urologic Division.* In the second year, the medical students are given a course in physical diagnosis which includes one demonstration of urologic examination in the normal individual. In the fourth year, ward rounds and lectures are given by the upper staff every Thursday afternoon and Saturday morning for students in their surgical quarter. Small groups are selected from the senior surgical group and assigned in rotation to the urologic department for concentrated study for a two weeks' period. These students spend all of their time with the urologic hospital patients and out-patients in the Urology Clinic under supervision of the resident and upper urologic staff. They work

up the hospital patients on the ward, attending to all the diagnostic procedures with the help of the resident staff when necessary. They are encouraged to act as assistants in the surgery on their patients. They are invited to attend all Urologic Rounds, Staff Conferences and Journal Club Meetings. Students are assigned to urology work with the upper staff in consultation and also the resident staff in taking care of the urologic patients in the out-patient clinic every afternoon. Following this, ward rounds and x-ray conferences are held every day by the resident staff and the students are encouraged to attend these sessions. As in evident, there is the closest association and constant supervision of these students by both the upper and resident staff during their assignment to the urology division. Students are also urged to work on a research problem and to the services of the urologic research laboratory is made available to them for this study.

## *Veterinary Medicine*

John C. LeMay, D.V.M. (Georgia, 1959), *Assistant Professor of Veterinary Medicine and Director of the Department.*
Nickolas J. Sojka, B.S., D.V.M. (Kansas, 1958), *Assistant in Veterinary Medicine.*

The function of this Department is to facilitate the various teaching and research programs that require laboratory animals. Veterinary medical consultation is provided for research projects in which experiments are conducted on animals. Assistance is made available in selecting the most suitable species or strain of laboratory animal to use in a given study. In addition, animals are procured, quarantined and appropriately conditioned in order to provide a highly reliable biological tool. A wide variety of technical services are carried on, such as providing whole blood of a variety of species, collecting biological specimens, providing clinical pathologic examinations, preparing animals for surgery, post-surgical care, and maintenance of the animal colonies.

The department collaborates with those departments of the School of Medicine that utilize laboratory animals in their teaching programs. Various disease states are experimentally produced in animals for student observation and study and techniques for collecting of biological specimens for additional study are demonstrated. Aid is given in setting up and carrying out these demonstrations and studies on animals.

A post-doctoral training program in laboratory animal medicine has been initiated and plans are under way to increase the number of available training positions.

Although the department is in an early stage of development, some research is under way on some of the spontaneous diseases of laboratory animals.

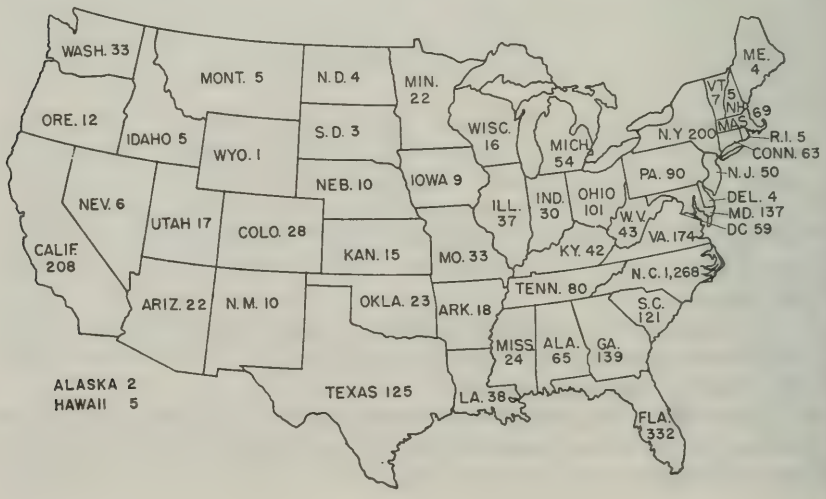
# Organizations

## *Duke University Medical Alumni*

The Duke University Medical Alumni now number over four thousand, one hundred. Membership includes all graduates of the medical school (total through 1963—2,169), past and present faculty, all past and present house-officers of Duke Hospital (including the 1,958 who are not Duke graduates); making a grand total of 4,127. Associate membership is held by alumni of the following Paramedical Services: Hospital Administration, Dietetics, Social Service, Laboratory Technique, X-Ray Technology, Physical and Occupational Therapy, Medical Record Library, and Medical Art and Illustration.

Larry Turner '39, President (Durham, N. C.)
K. D. Weeks '39, Vice-President (Rocky Mount, N. C.)
George J. Baylin '37, Treasurer (Duke University Medical Center)
Talmage L. Peele '34, Secretary (Duke University Medical Center)
Roger L. Marshall, Director of Alumni Affairs (Duke University)
William B. Jennings, Jr., Assistant to the Director of Alumni Affairs (Duke University)

A newsletter is sent to all the members in January, April, July and October of each year. Reunions are held every three years in



Durham, the next is planned for 1964. Alumni groups have been formed in several states.

Alumni luncheons or dinners are held during the following meetings: The American Medical Association, The Southern Medical Association, The North Carolina Medical Society, and The American Academy of Pediatrics.

The map shows states in which Duke Medical Alumni are located and the number in each state. Figures include those who received the M.D. degree from Duke and those who have served a year or more on the house staff.

Not shown are the 198 physicians serving in territories of the U.S. and in foreign countries* and 56 on duty in the Armed Forces overseas. A total of 3,873 physicians are distributed among all the United States.

## *Student Government Association*

In every field of endeavor there should be certain guidelines for acceptable conduct. The future doctor is fortunate in that his path was inscribed for him many centuries ago by a great physician and philosopher, Hippocrates. Every graduate of a recognized medical school has sworn to uphold Hippocrates' vows. But before he is permitted to swear this oath he must undertake the long and arduous course which leads to the M.D. degree. Here, mere intellectual achievement is not sufficient: the student must develop character and judgment worthy of this noble profession. As in every society, the individual must comport himself in a manner which does not bring disgrace upon himself or his school. An honor system should be as general as this. At Duke, any person who fails in this respect must answer for his actions to the Honor Council and the administration.

The Student Government Association is composed of 16 elected members of the student body: three officers, three representatives from each class, and the President of SAMA or his appointee. This group accepts the responsibility for the review of disciplinary matters brought to its attention through its role as Honor Council. All students entering the school are required to comply with this system of government.

Other responsibilities of the SGA include the initiation of the

* Afghanistan, one; Australia, two; Belgium, three; Brazil, seven; Canada, twenty-eight; Chile, eight; China, one; Colombia, ten; Cuba, four; Denmark, one; Egypt, one; Formosa, nine; France, three; Germany, three; Greece, one; Guatemala, five; Iceland, three; India, five; Iran, three; Iraq, one; Ireland, one; Italy, one; Jamaica, B.W.I., one; Japan, eighteen; Jordan two; Kenya, one; Korea, four; Lebanon, one; Malaya, one; Mexico, seven; Nigeria, one; Norway, two; Panama, four; Paraguay, one; Peru, two; Philippine Island, six; Puerto Rico Rico, three; Rhodesia, one; Scotland, one; South Africa, two; Sweden, three; Switzerland, two; Thailand, six; United Kingdom, twenty-two; Venezuela, five; Virgin Islands, one.

freshman advisory council, publication of the school yearbook, the Davison Scholar program, and social events. The group also serves as the court of appeals for traffic violations.

## *The Duke Sama Chapter*

Representing 75% of the medical student body, the Duke Chapter of the Student American Medical Association is a service organization interested in a wide spectrum of activities. SAMA is the only international organization which represents the opinions and desires of the future physicians of America.

Chartered only recently, the organization has earned a reputation for its interest in medical recruitment in conjunction with the admissions committee, a summer externship program, a directory of the medical center, a listing of research opportunities for medical students and many other service projects. Recently SAMA has joined the International Federation of Student Medical Associations; this union promises to provide a means to increase the opportunities for study outside the United States. The Duke Chapter has been very active in the national organization.

## *Standing Committees of the School of Medicine*

ADMISSIONS

J. E. Markee (Chairman), Byrne, Cherny, Duke, Elchlepp, Fetter, Hendrix, Kaufman, McCollum, Overman, Rhoads. Ex-officio Member: Anlyan.

BEAUMONT

D. B. Hackel (Chairman), Markee, Metzgar, Salzano, Shingleton.

BORDEN AWARD

J. P. Hendrix (Chairman), Pickrell, W. Smith.

BUILDING

L. E. Swanson (Chairman), Anlyan, Beard, Boone, Busse, Clark, Conant, Frenzel, Gardner, Handler, Harris, Hart, Jacobansky, Kinney, Markee, Parker, Reeves, Stead, Tosteson, Woodhall.

CANCER TRAINING

W. W. Shingleton (Chairman), Harris, Kinney, Laszlo, R. Parker, Reeves, A. Smith.

CARDIO-VASCULAR TRAINING

K. S. Grimson (Chairman), Harris, McIntosh (ex-officio), Stead, Tosteson.

CLINICAL RESEARCH

M. D. Bogdonoff (Chairman), Cohen, E. A. Davidson, Rundles, Sidbury, Stempfel, Thiers, Wyngaarden.

CLINICAL SERVICE LABORATORIES

T. D. Kinney (Chairman), Frenzel, Osterhout, P. Smith, Thiers.

CONTINUATION EDUCATION

W. M. Nicholson (Chairman), Baylin, Markee.

CO-ORDINATION OF PARAMEDICAL SERVICES

H. L. Kaiser (Chairman), Cahoon, Clark, Jennings, Markee, Mengel, W. W. Smith, Stephen, Tate, Wyngaarden.

CURRICULUM

H. O. Sieker (Chairman), Busse, Callaway, DeMaria, Frenzel, Harris, E. C. Long, Markee, McIntosh, W. P. J. Peete, Young.

DAVISON SCHOLARSHIP COMMITTEE

E. C. Long (Chairman), Nashold, W. P. J. Peete. (Plus student representatives).

DURHAM VETERANS HOSPITAL DEAN'S COMMITTEE

W. G. Anlyan (Chairman), Estes (Vice-chairman), Busse, Gardner, Kinney, Reeves, Stead.

HANES AND UNITED FUNDS

D. T. Smith (Chairman), Gardner, Harris, Semans.

HOSPITAL POLICY

C. H. Frenzel (Chairman), Busse, Carter, Gardner, Harris, Stead.

HOSPITAL RECORDS

E. L. Persons (Chairman), Mrs. Bufkin, Clark, Frenzel, Gardner, Goldner.

ISOTOPE

P. Handler (Chairman), Baylin, Frenzel, Harris, C. Knight, Nicholson, Pircher, Reeves, Sanders, Shingleton.

LIBRARY

Mrs. J. H. Semans (Chairman), Bernheim, Cavanagh, Gardner, Long, Mrs. P. Miller, D. T. Smith.

MEDICAL EDUCATION FOR NATIONAL DEFENSE

F. W. Clippinger (Chairman), Bassett, DeMaria, Fetter, Frenzel, Georgiade, Hohman, Mitchell, North, Sanders, D. Smith, Stickel, B. Worde.

OUT PATIENT POLICY

R. Parker (Chairman), Bogdonoff, DeMaria, Elwell, Llewellyn, W. P. J. Peete, Stickel.

PATIENT POLICY

L. E. Swanson (Chairman), Clark, Cobb, Crenshaw, Dees, Reeves, Sealy, Wyngaarden.

PHYSICAL AND OCCUPATIONAL THERAPY

F. W. Clippinger (Chairman), Frenzel, Hall, Huckabee, Kaiser, Lowenbach, Markee, Persons.

REHABILITATION ADVISORY

R. A. Gregg (Chairman), Belue, Bogdonoff, Clark, Clippinger, Jennings, Kaiser, Mattingly, Nashold, Nichols, Semans.

SOCIAL SERVICE

W. M. Nicholson (Chairman), Busse, Carter, Frenzel, Harris.

STUDENT FELLOWSHIPS

E. C. Long (Chairman), Sealy.

# Duke Hospital

## *Administrative Staff*

Charles H. Frenzel, A.B. (Duke, 1941), *Superintendent and Professor of Hospital Administration.*

Louis E. Swanson, A.B. (Hamline, 1941), *Assistant Superintendent and Associate Professor of Hospital Administration.*

Charles C. Boone, A.B. (Duke, 1951), *Assistant Superintendent and Instructor in Hospital Administration.*

Ralph E. Jennings, B.A., B.S. (East Tennessee State, 1954), *Administrative Assistant and Instructor in Hospital Administration.*

Stanley W. Elwell, B.S. (Iowa State University, 1955), *Director of Clinics.*

George B. Kantner, B.S. (Penn. State, 1940), *Personnel Director.*

James W. Anderson, B.B.A. (Univ. of Miami, 1951), C.P.A. (1955), *Business Officer.*

Paul W. Aitken, A.B. (Morris Harvey, 1951), B.D. (Duke, 1955), Th.M. (Duke, 1961), *Chaplain.*

## *Private Diagnostic Clinic Staff*

Clarence H. Cobb, Ph.G. (UNC, 1933), *Business Manager, Medical Division.*

Roy N. Crenshaw, *Business Manager, Surgical Division.*

H. D. Maynard, B.S. (UNC, 1947), M.A. (UNC, 1949), *Assistant Business Manager, Surgical Division.*

George A. Whiteside, B.S. (UNC, 1956), *Assistant Business Manager, Medical Division.*

## *Technical Staff and Heads of Hospital Divisions*

William Arthur Gay, B.A. (Richmond Professional Institute, 1957), *Administrative Assistant and Unit Administrator.*

Dorothy Ellen Tate, B.S., M.S. (Pennsylvania State University, 1946, 1952), *Director and Associate Professor of Dietetics.*

I. Thomas Reamer, Ph.G. (Maryland, 1924), *Pharmacist and Associate in Pharmacy.*

J. Harned Bufkin, R.N., R.R.L. (Indiana, 1922), *Medical Record Librarian and Associate Professor of Medical Record Library Science.*

Lelia R. Clark, R.N. (Mt. Sinai, 1932), B.S. (Columbia, 1947), M.A. (Columbia, 1948), *Director, Nursing Service and Professor of Nursing.*

Helen L. Kaiser, R.P.T. (Harvard, 1921), *Director and Associate Professor of Physical Therapy.*

Bert R. Titus, *Director and Assistant Professor of Orthosis and Prosthesis.*

Elon H. Clark, *Director and Professor of Medical Art and Illustration.*

Martha J. Scoggins, *Executive Housekeeper.*

Cecil Carden, *Supervisor, Printing Department.*

Leatrice B. Emory, *Supervisor, Electrocardiographic and Basal Metabolic Laboratory.*

Preston W. Smith, *Supervisor, Private Medical Laboratory and Technical Associate in Laboratory Science.*

Edward T. Parrish, *Manager, Laundry.*

Bernice A. Belue, O.T.R. (Washington Univ., 1956), *Director of Occupational Therapy.*

Gretchen J. Cheek, R.N. (Duke, 1934), *Central Supply Services.*

Margaret Ann W. Watson, R.N. (Hosp. Univ. of Pennsylvania, 1959), *Acting Supervisor, Operating Rooms.*

C. Ronald Stephen, M.D. (McGill, 1940), *Anesthesiologist and Professor of Anesthesiology.*

Robert J. Reeves, M.D. (Baylor, 1924), *Radiologist and Professor of Radiology.*

Aaron P. Sanders, M.S. (Rochester, 1952), *Director, Isotope Laboratories and Assistant Professor of Radiology and Biophysics.*

Ivan W. Brown, M.D. (Duke, 1940), *Director, Blood Bank and Professor of Surgery.*

Ralph E. Thiers, Ph.D. (Toronto, 1947), *Director, Clinical Chemistry Laboratories, and Associate Professor of Biochemistry.*

## *Internship and Residencies*

Straight internships of one year duration are available in Medicine, Surgery, Pathology and Pediatrics, and two mixed internships are offered in Obstetrics and Pediatrics. Appointments are from July 1 through June 30 with few exceptions. Interns receive a stipend of $150.00 per month, with uniforms and laundry of uniforms provided.

The Residencies offered, with the Chairman of each service, are as follows:

| | |
|---|---|
| Anesthesiology | C. Ronald Stephen, M.D. |
| Internal Medicine | (Chm.) Eugene A. Stead, Jr., M.D. |
| Dermatology | J. Lamar Callaway, M.D. |
| Neurology | Albert Heyman, M.D. |
| Obstetrics & Gynecology | (Chm.) Bayard Carter, M.D. |
| Pathology | (Chm.) Thomas D. Kinney, M.D. |
| Pediatrics | (Chm.) Jerome S. Harris, M.D. |
| Psychiatry | (Chm.) Ewald W. Busse, M.D. |
| Radiology | (Chm.) Robert J. Reeves, M.D. |
| Surgery—General | (Chm.) Clarence E. Gardner, M.D. |
| Neurological Surgery | Guy L. Odom, M.D. |
| Ophthalmology | W. Banks Anderson, Sr., M.D. |
| Oral Surgery | Nicholas G. Georgiade, M.D. |
| Orthopaedic Surgery | Lenox B. Baker, M.D. |
| Otolaryngology | William R. Hudson, M.D. |
| Plastic Surgery | Kenneth L. Pickrell, M.D. |
| Thoracic Surgery | W. C. Sealy, M.D. |
| Urology | James F. Glenn, M.D. |

Application forms and information for internships, residencies or available fellowships may be obtained by writing to the Chairman of Department, Duke University Medical Center, Durham, North Carolina. Both men and women graduates of any Class A Medical School are eligible for appointment. While internships are rarely available to graduates of medical schools outside the United States and Canada, a limited number of residencies and research fellowships are available

from time to time in which case certification by E. C. F. M. G. (Educational Council on Foreign Medical Graduates, 1710 Orrington Avenue, Evanston, Illinois) is prerequisite.

Duke University Medical Center is a participating member of the National Intern Matching Program, 2530 North Ridge Avenue, Evanston, Illinois, and all applicants must register with this program. The Hospital is a member of the American Hospital Association, is approved by the American Medical Association for internship and residency training, and is fully approved by the Joint Commission on Accreditation of Hospitals.

The Duke University Medical Center is an integral part of Duke University which makes its educational, recreational and athletic facilities available for the Resident Staff.

The Durham Veteran's Administration Hospital adjoins the Duke University Campus, and is operated under the supervision of the Dean's Committee of the Duke University School of Medicine. The full time professional staff of the Veteran's Hospital are all members of the School of Medicine faculty. All training programs are integrated with corresponding programs at Duke University Medical Center, which includes rotating of House Officers to each hospital from time to time.

## *Postgraduate Study*

William M. Nicholson, M.D., *Professor of Medicine and Assistant Dean in Charge of Postgraduate Education.*

Graduates in medicine are welcomed at the various specialty clinics in Medicine, Surgery, Obstetrics, and other specialties from 9:30 A.M. to 12:30 P.M. each morning except Sunday.

Ward rounds are given in Medicine in the mornings as general Out-Patient Clinics are in session in the afternoon. Throughout the entire year there are concentrated formal types of Postgraduate instruction in the way of Symposia and study groups. These include subjects for the generalist as well as for the various specialties. Announcements concerning these Symposia will be made from time to time.

# Paramedical Courses at Duke Medical Center

## *Paramedical Coordinating Committee*

Helen L. Kaiser (Chairman), Misses Clark and Tate, Drs. DeMaria, Markee, W. Smith, Stephen, Wyngaarden, Messrs. Cahoon and Frenzel.

## *Dietetics*

Dorothy Ellen Tate, B.S., M.S., *Director and Assistant Professor of Dietetics.*

Mary Helen McLachlan, B.S., M.A., *Educational Director and Associate Professor of Dietetics.*

Mary Lou Pate, B.S., *Administrative Dietitian and Instructor in Dietetics.*

Nancy Curtis, B.S., *Administrative Dietitian and Instructor in Dietetics.*

Donna Lou Pelfrey, B.S., *Clinic Dietition.*

Paula Jane Morris, B.S., *Research Dietition.*

Charlotte Mackensen, B.S., *Therapeutic Dietition.*

Kathleen Wholihan, B.S., *Therapeutic Dietition.*

## *Hospital Administration*

Ray Everett Brown, B.S. (UNC, 1937), M.B.A., (U. of Chicago, 1943), H.H.D. (Wake Forest College, 1958), *Director of Program and Professor of Hospital Administration.*

Charles H. Frenzel, A.B. (Duke, 1941), *Superintendent and Professor of Hospital Administration.*

Louis E. Swanson, A.B. (Hamline, 1941), *Assistant Superintendent and Associate Professor of Hospital Administration.*

Donald S. Smith, II, A.B. (Dartmouth, 1951), M.H.A. (Minnesota, 1953), *Program Coordinator and Assistant Professor of Hospital Administration.*

Charles C. Boone, A.B. (Duke, 1951), *Assistant Superintendent and Instructor in Hospital Administration.*

Ralph E. Jennings, B.A., B.S. (East Tennessee State, 1954), *Assistant Superintendent and Instructor in Hospital Administration.*

Richard A. Bindewald, A.B. (Furman, 1953), *Assistant to the Dean and Instructor in Hospital Administration.*

Clarence H. Cobb, Ph.G. (UNC, 1933), *Business Manager, Medical Division and Instructor in Hospital Administration.*

### CLINICAL PRECEPTORS AND LECTURERS

E. C. Bryson, LL.B. (Oregon, 1937), *University Attorney and Professor of Law.*

Blanton S. Russell, M.D. (Louisville, 1930), *Director, Durham V.A. Hospital, and Assistant Professor of Hospital Administration.*

Marshall I. Pickens, A.B. (Duke, 1925), M.A. (Duke, 1926), *Executive Director, Hospital and Orphan Sections, The Duke Endowment, and Associate in Hospital Administration.*

George P. Harris, A.B. (Duke, 1926), *Field Director, Hospital and Orphan Sections, The Duke Endowment, and Instructor in Hospital Administration.*

James R. Felts, Jr., *Assistant Executive Director, Hospital and Orphan Sections, The Duke Endowment, and Instructor in Hospital Administration.*

H. Carl Rowland, B.S. (Davidson, 1942), *Director, Planning and Design Service, Hospital and Orphan Sections, The Duke Endowment, and Instructor in Hospital Administration.*

B. G. McCall, B.S. (Clemson, 1950), *Director, Management Service, Hospital and Orphan Sections, The Duke Endowment, and Instructor in Hospital Administration.*

William F. Andrews, A.B. (Duke, 1948), *Administrator, Wake County Memorial Hospital.*

Joseph E. Barnes, B.S. (Carnegie Tech., 1939), M.B.A. (Chicago, 1947), *Director, Rex Hospital.*

John F. Moulton, B.A. (California, 1941), M.S. (Columbia, 1947), *Director, Watts Hospital.*

J. Minetree Pyne, B.S. (UNC, 1940), *Administrator, Alamance County Hospital.*

Graduate education for hospital administration is offered through a 24-month program conducted jointly by the Graduate School of Arts and Sciences and the Medical Center. The Program consists of selected graduate courses in Economics, Political Science, Sociology, and Hospital Administration, and of a 12-month administrative residency in hospitals and other health agencies. The Master of Hospital Administration degree is awarded to those who successfully complete the Program.

Detailed information my be obtained from:

Program in Hospital Administration
Duke University Medical Center
Durham, North Carolina

## *Medical Art and Illustration*

Elon H. Clark, *Profesor of Medical Art and Illustration.*

Robert L. Blake, *Assocate in Medical Art and Illustration.*

Henry F. Pickett, *Associate in Medical Photography.*

Raymond L. Howard, *Instructor in Medical Photography.*

Leonard Hart, *Instructor in Medical Photography and Chief of Medical Illustration at Veterans Administration Hospital.*

The function of this Division is to produce visual aids by means of various art and photographic methods for staff members allied to medicine. These visual aids are used to enhance the medical records and to aid in research and education. Services offered by this Division are: 1. Medical Art: Illustrations, by means of various artistic techniques, depicting anything perceptible to the eye, the existing but unseen and even the theoretic, as well as mechanical drawings, dia-

grams, charts, graphs, lettering, casts, models, exhibits, etc. 2. Medical Photography: Illustrations of anything to which available photographic equipment will respond. This division produces still and motion pictures, microphotographs, pictures of the retinae, photographic copies, film strips, lantern slides, enlargements and contact prints. Services offered directly for the patient's benefit are: Production of various types of anatomical prostheses and instruction in the use of opaque cosmetics. Facilities for individual training in specific techniques or methods employed by this division are available. No academic credit is given. Prerequisites, tuition, time and type of training are determined by the Chairman of this division. No regular courses of instruction in medical art and photography or their allied fields are offered.

## *Nurse Anesthesia*

Charles Ronald Stephen, M.D.C.M., D.A., *Professor of Anesthesiology and Chief of Division of Anesthesiology.*

Mary B. Campbell, C.R.N.A., *Instructor in Nurse Anesthesia and Chief Nurse Anesthetist.*

Evelyn E. Auld, C.R.N.A., *Instructor in Nurse Anesthesia and Chief Nurse Anesthetist, Watts Hospital, Durham, North Carolina.*

Mary M. Gardner, C.R.N.A., *Educational Program Director.*

Leola A. Glenn, C.R.N.A., *Assistant Nurse Anesthetist.*

Frances R. Perry, C.R.N.A., *Assistant Nurse Anesthetist.*

Annie Mae Truitt, C.R.N.A., *Assistant Nurse Anesthetist.*

Mary P. Haigler, C.R.N.A., *Assistant Nurse Anesthetist.*

Frances Watkins, C.R.N.A., *Assistant Nurse Anesthetist.*

The eighteen months course in anesthesia is available to well qualified registered nurses. Instruction embraces the theoretical aspect and clinical application of all drugs and techniques in accepted usage. The program is divided into quarters. The major part of the basic theoretical instruction is given during the first three quarters. After a preclinical period of eight weeks, clinical practice runs parallel with the theoretical program. One class is accepted annually and enrolled January 15. All appointments of the current year are made by Steptember 1 of the preceding year. Graduates of this course are eligible to take the qualifying examination for membership in the American Association of Nurse Anesthetists. Tuition is $150.00. Additional information concerning nurse anesthesia may be obtained from Mary B. Campbell, C.R.N.A., P.O. Box 3204, Duke University Medical Center, Durham, North Carolina.

## *Nursing*

Lelia R. Clark, R.N., M.A., *Director of Nursing Service.*

Louise M. Beard, R.N., B.S., *Coordinating Instructor of Practical Nursing Division.*

Kathryn J. Gray, R.N., *Instructor of Practical Nursing Division.*

*Practical Nursing Division of the Vocational Education Department of the Durham City Schools, Duke Unit.* After four months of classroom instruction at the Durham Industrial Education Center eight months are spent in classes and practical training at Duke Hospital. At the completion of this course the student receives a certificate in practical nursing and is eligible for licensure as a practical nurse in North Carolina.

## *Physical Therapy*

Helen Kaiser, R.P.T., *Associate Professor of Physical Therapy and Director of Physical Therapy.*
Grace C. Horton, B.S., R.P.T., *Associate in Physical Therapy and Supervisor of Treatment Division.*
Eleanor M. Flanagan, A.B., M.A., R.P.T., *Assistant Professor in Physical Therapy.*
Edna Blumenthal, B.S., *Associate in Physical Therapy.*
Carolyn Burnett, B.S., M.S., R.P.T., *Associate in Physical Therapy.*
John Riebel, B.A., B.D., M.A., R.P.T., *Associate in Physical Therapy.*
Barbara Taylor, B.S., R.P.T., *Coordinator of Physical Therapy Education.*
Constance W. Peake, A.B., R.P.T., *Secretary-Recorder for the Curriculum in Physical Therapy.*
Barbara Dantzler, B.A., R.P.T., *Assistant Clinical Supervisor.*
Idell Parrish, B.S., R.P.T., *Coordinator for Extension Services in Physical Therapy.*
Ann Settlemyre, B.S., R.P.T., *Assistant in Physical Therapy Extension Services.*
Emy Villanueva, B.S., R.P.T., *Assistant in Physical Therapy.*
Christine von Arnim, B.A., R.P.T., *Assistant in Physical Therapy.*
Katherine W. LeGuin, B.A., R.P.T., *Assistant in Physical Therapy.*
Jo Abernathy, B.S., R.P.T., *Assistant in Physical Therapy.*
Judith Cantey, B.S., R.P.T., *Assistant in Physical Therapy.*
Lee Grabski, B.S., R.P.T., *Assistant in Physical Therapy.*
Gisella Hendley, B.S., R.P.T., *Assistant in Physical Therapy.*

The Curriculum in Physical Therapy at Duke University is conducted under the joint auspices of the Graduate School of Arts and Sciences and the Medical Center.

Two programs are offered:

1. The Program leading to a Certificate in Physical Therapy and a Master of Arts Degree. This is in two phases:

a. In the first year the necessary credit courses may be selected from the following: Anatomy M201, 6 units; M202, 3 units; M203, 4 units; M205, 2 units; M313-314, 2 units; Physiology M261-262, 8 units; Phychology S232, 3 units; M279, 1 unit; M370, 2 units; M372, 3 units; Biochemistry 201, 3 units; Zoology 252, 4 units; 245, 3 or 4 units; 271, 4 units.

b. In the second year in addition to the thesis, the physical therapy procedure courses listed in program two and practicum may be completed.

Upon completion of the total two year program a Certificate in Physical Therapy and a Master of Arts Degree are awarded.

2. The Certificate Program.

A baccalaureate degree or a plan for receiving such a degree from the preparatory college upon completion of the physical therapy program is essential for admission.

The program includes basic science courses from those listed in program one in addition to courses in kinesiology, pathology, physical therapy and rehabilitation as related to the medical and surgical specialties, administration, ethics and physical therapy procedure courses. Sixteen weeks of clinical experience are provided on a rotation basis at Duke University Medical Center, affiliated hospitals, and state and county health departments.

The entire curriculum including the practicum may be completed in fifteen months.

Prerequisites for both programs are basic courses in psychology, mathematics through trigonometry, and one year laboratory courses in chemistry, a biological science exclusive of botany, and physics covering the principles of heat, mechanics and electricity. In addition, those undertaking the Master of Arts Program must meet the requirements of their selected major.

Tuition and health fees are $1,200 for the fifteen month's certificate program. For the program leading to a Master of Arts degree the cost is approximately $1,800. Scholarship and loan funds are available.

Graduates of either program are eligible for state and national licensing and registration examinations and membership in the American Physical Therapy Association.

For further information write to the Director of Physical Therapy, Box 3247, Duke University Medical Center, Durham, North Carolina.

## *Prosthetic and Orthopaedic Appliances*

Bert R. Titus, C.P., C.O., *Director and Assistant Professor of Orthotics and Prosthetics.*

Robert O. Gooch, C.P., *Assistant Prosthetist and Orthotist.*

Percy H. Ray, C.O., *Assistant Orthotist.*

The function of this department is to produce prosthesis and orthopaedic applicances for the medical profession. Facilities for individual training in specific techniques or methods employed by this department are available. Those who complete four years' training are eligible to take the examination of American Board of Certification.

## *Radioisotope Technology*

Robert J. Reeves, M.D., *Professor of Radiology and Chairman of the Department.*
George J. Baylin, M.D., *Professor of Radiology.*
Felix J. Pircher, M.D., *Assistant Professor of Radiology and Medical Director of Radioisotope Division.*
Aaron P. Sanders, M.S., *Assistant Professor of Radiology and Scientific Director of Radioisotope Division.*
Kathryn W. Sharpe, B.S., *Instructor in Radiology (Radioisotope Division).*
Conrad M. Knight, B.S., *Radiological Safety Officer of Duke University.*

The Radioisotope Division offers a three month training program of instruction and laboratory training for clinical radioisotope technicians, and a six month training program of instruction and laboratory training for research radioisotope technicians. This training includes work in all areas of the Radioisotope Division.

An applicant for admission must be a graduate of an approved high school and board certified (or eligible to take board examinations) in Medical Technology or X-ray Technology. Equivalent training and experience may be substituted for this requirement.

A registration fee of $100 is required. This fee includes tuition, and diploma fee for the course.

For further information address inquiries to: Mrs. Kathryn W. Sharpe, Instructor in Radiology (Radioisotope Division), Box 3166, Duke University Medical Center, Durham, North Carolina.

## *X-Ray Technology*

Robert J. Reeves, M.D., *Professor of Radiology and Chairman of the Department.*
George J. Baylin, M.D., *Professor of Radiology and Associate in Anatomy.*
William Francis Barry, M.D., *Associate Professor of Radiology.*
Patrick J. Cavanaugh, M.D., *Associate Professor of Radiology.*
Boyd Thomas Worde, M.D., *Associate Professor of Radiology.*
John B. Cahoon, R.T., FASXT; *Assistant Professor of X-Ray Technology, Technical Director.*
Aaron P. Sanders, M.S., *Assistant Professor of Radiology and Director of Isotope Laboratory.*
Mary Jane Lockhart, A.B., R.T., A.S.X.T., *Technical Instructor in Radiology and Supervisor.*
Eric Porter, R.T., A.S.X.T., *Technical Instructor in Radiology and Supervisor, Out Patient Department.*
Larry B. King, R.T., A.S.X.T., *Technical Assistant in Radiology.*

The School of X-ray Technology offers a two year training program of instruction and practical training in all divisions of the Department of Radiology.

Students are admitted the first Wednesday in September for two years of intensive training in the academic and practical aspects of radiographic therapeutic and radioisotope technique.

During the second year the students are paid a stipend of $100.00 per month. Upon completion of the course, the students are required to take the National Board Examinations in X-Ray Technology sponsored by the American Registry of X-Ray Technicians. The school is approved by the Council on Medical Education of The American Medical Association.

Candidates for admission must be graduates of approved high schools and rank in the upper third of their class. Candidates with college credits are given preference. Official transcripts of high school and/or college grades, a list of three references and a recent photograph must be included with the application before being considered by the Committee on Admissions. It is recommended that applicants be at least 20 years and not more than 30 years of age at the time of enrollment.

A registration fee of $25.00 is required upon the entrance and is payable to the Treasurer, Duke University, on the day of entrance. Books, supplies and uniforms are about $100.00. White uniforms and white shoes are required. Laundry of uniforms is furnished by the Medical Center. No living quarters are provided for paramedical students by the University and the students in X-Ray Technology live in town at their own expense. For further information or application blanks write John B. Cahoon, R.T., Technical Director, School of X-Ray Technology, Duke University Medical Center, Durham, North Carolina.

# Roster of Students



## CLASS OF 1967

Aaron, Paul (Rutgers Univ.), Highland Park, N.J.
Allen, David Geoffrey (Wesleyan Univ.), New York, N.Y.
Auburn, Robert Mark (Wash. & Lee), Falls Church, Va.
Austin, Henry Vann (Davidson College), Clinton, N.C.
Bath, Nicholas Middleton (Emory), Tampa, Fla.
Beshear, James Robert (Univ. of Ky.), Dawson Springs, Ky.
Blackburn, William W., II, (Duke), Fort Meade, Md.
Boggess Howard Preston (Yale), Fairmont, W.Va.
Broadbent, David N. (Univ. of Ill.), Champaign, Ill.
Brown, Gerald La Vonne (Johns Hopkins), Athens, Ga.
Brown, Walter A. (Hamilton College), Tuckahoe, N.Y.
Buehler, John Henze (Oberlin), Durham, N.C.
Bunin, John Thomas (Rutgers), Kearny, N.J.
Burwell, William (UNC), Warrenton, N.C.
Butler, Stephen Allen (Davidson), Columbus, Ga.
Campbell, Barry Blair (Johns Hopkins), Millville, N.J.
Chervin, Paul Niesen (Univ. of Vermont), Worchester, Mass.
Clark, James Ligon (Duke), Charlotte, N.C.
Crawford, Fred Allen, Jr., (Duke), Holly Hill, S.C.
Culver, Charles (Duke), Ringwood, N.J.
Danford, Jerry L. (Duke), Durham, N.C.
Dean, Arthur J., Jr. (U.S. Mil. Acad.), Laurinburg, N.C.
DeHart, Henry Sykes (VPI), Blacksburg, Va.
Delse, Frederick Charles (Mass. Inst. of Tech.), Cleveland, Ohio
Dodson, William Edwin (Duke), Durham, N.C.
Farber, Mark (Columbia College), Brooklyn, N.Y.
Flaherty, John T. (MIT), Delmar, N.Y.
Futrell, J. William (Duke), Lynchburg, Va.
Gaines, Robert W. (Univ. of Cincinnati), New York, N.Y.
Gallis, Harry Anthony (Princeton Univ.), Athens, Ga.
Galotto, John Anthony (Johns Hopkins), Hawthorne, N.J.
Gianaras, George Mike (Duke), Tarpon Springs, Fla.
Giordano, Vincent B. (Univ. of Rochester), Endicott, N.Y.
Grode, David Lloyd (Duke), Hewlett, Long Island, N.Y.
Harper, Eugene Jutson (Duke), Knightdale, N.C.
Hinternhoff, Mary T. (Duke), Leaksville, N.C.
Hollister, David William (Oberlin), Bethesda, Md.
Huddleston, John F. (Univ. of Fla.), Jacksonville, Fla.
Jones, Janice Elizabeth (Wilson College), Dover, N.J.
Jurgelsky, William (Rutgers), Kensington, Md.
Kendall, Malcolm Eugene (Duke), Durham, N.C.
Kesler, Richard William (Johns Hopkins), Lansing, Ill.
*Klein, Gary Bruce (Pomona College), Pasadena, Calif.
Kurtz, Robert Melvyn (Cornell Univ.), Rockville Centre, N.Y.
Levine, Michael Stuart (Univ. of Penn.), Macon, Ga.
Lynch, Charles T., Jr. (Duke), Beaufort, N.C.
Maniscalco, Benedict S. (Univ. of Fla.), Tampa, Fla.
Marcus, David L. (C.W. Post College), Mineola, N.Y.
Marshall, Robert N. (Davidson), Clemmons, N.C.
Matthews, Minor E. (Yale), Huntington, W.Va.
McLees, Byron D. (Johns Hopkins), Little Rock, Ark.
McMillan, Michael Reid (The Citadel), Conway, S.C.
Meriwether, Wilhelm D. (Michigan State), Charleston, S.C.
Miller, Robert F. (Haverford), Tallahassee, Fla.
Otchin, Neil Stuart (Univ. of Fla.), Miami Beach, Fla.
Parker, Herman Richard, Jr. (UNC), Chapel Hill, N.C.
Peery, Charles V., II (Davidson), Kinston, N.C.
Raynor, A. Clark (Wake Forest), Ormond Beach, Fla.
Riddick, Daniel Howison (Duke), Durham, N.C.
Robinson, Stephen C. (Emory), Griffin, Ga.
Rogol, Alan David (MIT), Seymour, Conn.
Rosati, Robert A. (Yale), Durham, N.C.
Saltz, James E., Jr. (Duke), St. Petersburg, Fla.
Samuels, Jesse David (Columbia Univ.), Flushing, N.Y.
Saunders, Wade H., III (Hampden-Sydney College), Roanoke, Va.
Scarborough, W. A., Jr. (Duke), Wendell, N.C.
Scherer, James L. (Kenyon College), Niles, Ohio
*Withdrew October 17, 1963.

Schneider, Henry C., Jr. (Williams College), Meadowbrook, Pa.
Segal, Herbert Erwin (Rutgers), Newark, N.J.
Speropoulos, Athan John (Johns Hopkins), Miami, Fla.
Stowell, R. Jeremy Averill (Northwestern), Broken Arrow, Okla.
Stubbs, Allston J., Jr. (Duke), Durham, N.C.
Thrash, Melvin Lawrence (Duke), Asheville, N.C.
Trout, Hugh Henry, III (Wash. & Lee), Roanoke, Va.
Twele, Thomas (Columbia College), Syosset, N.Y.
Underwood, Lee C., III (Oberlin), Canton, Ohio
Vollmer, Robin T. (Duke), Louisville, Kentucky
Wetterau, Norman W. (Wheaton College), Akron, Ohio
Wilfong, Robert F. (UNC), Carrboro, N.C.
Williams, Donald Jarvis (Univ. of Hawaii), Honolulu, Hawaii
Willson, Leroy M., Jr. (UNC), Oxford, Ga.
Willwerth, Ben Matthews (Duke), Montour Falls, N.Y.
Woodard, William T., Jr. (Duke), Coral Gables, Fla.

CLASS OF 1966

Adler, Charles S. (Cornell), Flushing, N.Y.
Alexander, James Allen (Davidson), Gastonia, N.C.
Allen, Barna T., Jr. (Duke), Leaksville, N.C.
Allen, David W. (Duke), Tampa, Fla.
Allen, James Kenneth (Univ. of S.C.), Florence, S.C.
Appen, Richard E. (Duke), Nashville, Tenn
Arndt, Hans Joachim (Free University), Taunusstrasse, West Germany
Ballentine, Rudolph M., Jr. (Duke), Ballentine, S.C.
Bechtel, Richard C., Jr. (Swarthmore), Doylestown, Pa.
Berry, Peter Evans (Yale), Atlanta, Ga.
Bland, Wiley R. (N.C. State), Edward, N.C.
Borden, Ernest C. (Harvard), Fayetteville, Ark.
Bradford, John W. (Washington & Lee), Charleston, W. Va.
Brian, Earl W., Jr. (Duke), Raleigh, N.C.
Brown, Robert G. (Univ. of Va.), Norfolk, Va.
Burk, Peter G. (Duke), Minneapolis, Minn.
Carr, William Alexander (Princeton), Charlotte, N.C.
Clark, Joe L. (Emory), Delray Beach, Fla.
Cooper, Edwin B., Jr. (Duke), Arlington, Va.
Crook, John N. (Howard), Opelika, Ala.
Currie, Donald P. (Davidson), Charlotte, N.C.
Daniel, Eubert J. (Valparaiso), New Britain, Conn.
Davis, Walter Etchells (Bowdoin), Easley, S.C.
Dick, William B. (Washington & Lee), Morristown, Tenn.
Dillingham, William S. (Harvard), Lancaster, S.C.
Donovan, Lawrence T. (UNC), Chapel, Hill, N.C.
Ferris, Barry (Duke), Haifa, Israel
Fisher, Robert B. (Centre College), Bay Shore, N.Y.
Ford, Raymond F. (Penn. State), Chatham, N.J.
Fox, William W. (Duke), Ruxton, Md.
Graham, Doyle Gene (Texas A. &. M.), Knox City, Texas
Grant, John Andrew, Jr. (Harvard), Tallahassee, Fla.
Greene, John Elbert (Duke), Tallahassee, Fla.
Grehl, Todd M. (Duke), Ft. Lauderdale, Fla.
Halikas, James (Brooklyn), Brooklyn, N.Y.
Hammett, Elliott B. (Yale), Spartanburg, S.C.
Hayter, George M. (Stanford), Long Beach, Calif.
Herron, Charles B. (Memphis State), McKenzie, Tenn.
Hitch, David C. (Univ. of N.C.), Raleigh, N.C.
Hopkins, Christie Benet (Univ. of the South), Columbia, S.C.
Hudson, Terry M. (Duke), Charleston, W. Va.
Johnson, James R. (Duke), Tulsa, Okla.
Katz, Sheila (Univ. of Chicago Med. School), Durham, N.C.
Kline, George L. (Univ. of Tenn.), Robbins, Tenn.
Kohler, Stewart E. (Univ. of Va.), Blacksburg, Va.
Krokidas, Peter J. (Boston Univ. School of Medicine), Springfield, Mass.
Lewis, Alvin M. (Univ. of Fla.), Durham, N.C.
Lohrbauer Leif A. (Yale), Clearwater, Fla.
Martin, Mitz McDowell (Univ. of Va.), Halifax, Va.
McCully, James Craig (Univ. of Fla.), Jacksonville, Fla.
McGregor, Douglas (Duke), Pelham, N.Y.
McNeill, Emma Roberta (Duke), Columbia, S.C.
Mignone, Robert J. (Amherst), New Haven, Conn.
Moorman, Claude (Duke), Miami, Fla.
Morriss, Frank H., Jr. (Univ. of Va.), Birmingham, Ala.
Nash, James L. (Duke), Durham, N.C.
Newmark, Emanuel (Univ. of Amsterdam), Newark, N.J.
Niemeyer, Charles J. (Washington & Lee), Silver Spring, Md.
Norton, Charles B., Jr. (Duke), Jacksonville, Fla.
Obenour, William H., Jr. (Univ., of Tenn.) Knoxville Tenn.
Osteen, Robert Tilden (Dartmouth), Savannah, Ga.
Palmer, Earl Alfred (Ohio State), Washington C.H. Ohio

Perriello, Vito A., Jr. (Univ. of Va.), Dunbar, W. Va.
Pierson, Willard C., Jr. (Duke), Raleigh, N.C.
Price, William D. (Oberlin), Bethesda, Md.
Ray, Karl (Univ. of N.C.), Greensboro, N.C.
Redding, Marshall (Duke), Asheville, N.C.
Rich, John M. (Duke), Covington, Ky.
Robertson, James D. (Duke), Weirton, W. Va.
Rozear, Marvin P. (Davidson), Jacksonville, Fla.
Shock, John Paul, Jr. (U.S. Mil. Acad.), Webster Springs, W. Va.
Smith, Craig T. (Wesleyan), Swarthmore, Penna.
Smith, David H. (Dartmouth), Hyattsville, Md.
Snead, Joseph A. (Duke), Anderson, S.C.
Taylor, Jane C. (Univ. of Mississippi), Tupelo, Miss.
Threlkel, Robert H. (Vanderbilt), Owensboro, Ky.
Valicenti, James Francis (Univ. of Bologna), Floral Park, N.Y.
Wasserman, Louis L., Jr. (Duke), Norfolk, Va.
Weber, Jaroy, Jr. (Baylor), Beaumont, Texas
Wellington, Catherine Ann (Dickinson), Panama City, Republic of Panama
Witherspoon, John Michael (Duke), Brookville, Md.
Zirkle, Lewis G., Jr. (Davidson), Blacksburg, Va.

## CLASS OF 1965

Andriola, Mary T. R. (Vassar), New York, N.Y.
Andriola, Michael J. (Duke), New York, N.Y.
Baker, Bernie B. (Duke), Tyner, N.C.
Barbee, John Y. (Vanderbilt), Bowling Green, Ky.
Bender, W. Raymond (Notre Dame), Red Springs, N.C.
Bigner, Darrel D. (Univ. of Ga.), Brunswick, Ga.
Boone, Stephen C. (Duke), Houston, Texas
Bossen, Edward H. (Florida), Jacksonville, Fla.
Butcher, Gene A. (Purdue), Lafayette, Ind.
Butcher, Suzanne (Wooster), Niles, Ohio
Cancellaro, Louis (Manhattan), New York, N.Y.
Cavallaro, Arthur G. (NYU), Floral Park, N.Y.
Clancy, Thomas P. (Harvard), Cincinnati, Ohio
Coville, Frederick V. (Deep Springs College, Calif.), Atkinson, N.C.
Crawford, Robert C. (Duke), Durham, N.C.
Crummie, Robert G. (Duke), Clinton, N.C.
DiCroce, Anthony Joseph (Rutgers), Newark, N.J.
Dirkers, Jerome D. (St. John's Univ.), Minneapolis, Minn.
Dunlap, William M. (UNC), Raleigh, N.C.
Emlet, John L. (Duke), Oak Ridge, Tenn.
Fagin, Ronald R. (Dartmouth), New York, N.Y.
Flint, Lewis M., Jr. (Duke), Ft. Bragg, N.C.
Frank, James L. (Duke), Mount Airy, N.C.
Gerber, Frederick H. (Cornell), Bethesda, Md.
Gold, Herman K. (William & Mary), Newport News, Va.
Goldman, David S. (Columbia), Forest Hills, N.Y.
Graybeal, Frederick O., Jr. (William & Mary), Marion, Va.
Gross, Richard H. (Alfred), Andover, N.Y.
Guazzo, Eugene J. (Auburn), Orange, N.J.
Hall, Snowden C., III (Duke), Danville, Va.
Harner, Russell E. (Washington & Lee), Los Angeles, Calif.
Harrelson, John M., III, (Duke), High Point, N.C.
Haslam, John B., II, (VMI), St. Petersburg, Fla.
Hasson, John Edwin (Tennessee), Johnstown, Pa.
Hawkins, David M. (Duke), Miami, Fla.
Hoyle, Thomas C., III, (Duke), Greensboro, N.C.
Katz Richard I. (Duke), Baltimore, Md.
Kay, Earl D. (Duke), Anderson, S.C.
Krueger, Ronald R. (Duke), Short Hills, N.J.
Kulvin, Stephen M. (Duke), Miami, Fla.
LeBauer, Eugene S. (Duke), Greensboro, N.C.
Linnemann, Calvin C., Jr. (Duke), Burlington, N.C.
Lively, Edmund P. (UNC), Reidsville, N.C.
Lucas, Bruce (Duke), Goldsboro, N.C.
Markee, Joseph E., Jr. (Davidson), Durham, N.C.
Maynard, David R. (Davidson), Los Altos, Calif.
McArtor Robert E. (Michigan), Salem, Ohio
McCracken, Joseph D. (Duke), Orlando, Fla.
McGregor, Frank Hamilton, Jr. (Duke), Mt. Kisco, N.Y.
Minus, Joseph S. (Yale), Charleston, S.C.
Nuckolls, James G. (Davidson), Galax, Va.
Odom, Guy L., Jr. (Duke), Durham, N.C.
Oken, Martin (Michigan), Rochester, N.Y.
O'Quinn, Aglaia Nikides (Duke), Dayton, Ohio
Powell, John G. (Washington & Lee), Silver Spring, Md.
Price, Andrew R. (Duke), Wilmington, Del.
Ramming, Kenneth P. (Valparaiso), Fort Wayne, Ind.
Reed, Ronald C. (McGill Univ. Med. School), Seattle, Washington

Reitt, James P. (Duke), Brooklyn, N.Y.
Riley, Charles P. (Washington & Lee), Winchester, Va.
* Robison, Michael L. (Duke), Anniston, Ala.
Rogers, Larry A. (Davidson), Raleigh, N.C.
Rouse, James B. (UNC), Raleigh, N.C.
Sanford, Edgar J. (Duke), Bath, N.Y.
Saputo, Leonard M. (California), Orinda, Calif.
Scheidt, Peter (Johns Hopkins), Highland, Md.
Schwam, Wallace J. (Albert Einstein Med. Sch.), Durham, N.C.
Scott, G. Stuart (Duke), Augusta, Ga.
Scott, Neil R. (Kansas State), Rozel, Kansas
Shore, James H., Jr. (Duke), Elkin, N.C.
Shultz, Kirkwood T. (Duke), Palm Beach, Fla.
Spencer, William H., III, (Duke), Mooresville, N.C.
Sternbergh, W. Charles A., Jr. (Brown), Providence, R.I.
Stewart, Betty (UNC), Pavo, Ga.
Stewart, Henry L. (Duke), Greenville, N.C.
Stewart, John Jamieson (Wagner College), Staten Island, N.Y.
Stone, Harry B., III, (Hampden-Sydney Col.), Roanoke, Va.
Straub, Karl D. (Duke), Henderson, N.C.
Sullivan Thomas A., Jr. (Duke), Arlington, Va.
Sulzycki, James J. (Ohio Wesleyan Univ.), Erie, Pa.
Taylor, Jack B. (Davidson), Smithfield, N.C.
Taylor, Kenneth W. (Northwestern), River Forest, Ill.
Venetta, Benjamin D. (Western Reserve), Warren, Ohio
Wagner, Galen S. (Duke), Connellsville, Pa.
Weeks, John (Davidson), Charleston, S.C.
Williams, Jack Dean (Duke), Beckley, W. Va.
Wright, Creighton B. (Duke), Maplewood, N.J.
Yancy, William S. (Duke), Arlington, Va.
Zaepfel, Joseph P. (St. Joseph's College), Mt. Holly, N.J.
Zirkle, Sara K. Shilling (Duke), Troy, Ohio

CLASS OF 1964

Alexander, Raymond H. (Princeton), Gastonia, N.C.
Allen, Benjamin L., Jr. (Wofford), Spartanburg, S.C.
Amstey, Marvin S. (Cornell), Steubenville, Ohio
Anderson, Page A. W. (California), Oakland, Calif.
Arluk, Irwin (Queens Col.), Richmond Hill, New York
Barber, Wayne S. (Amherst), Short Hills, N.J.
Barnett, Crawford F., Jr. (Yale), Atlanta, Ga.
Baxley, William W. (Emory), Macon, Ga.
Bell, Willis H., II (Harvard), Indiana, Pa.
Berne, Freeman A. (Univ. of S.C.), Columbia, S.C.
Bremer, Charles C. (Davidson), New Bern, N.C.
Carruth, James W., Jr. (Davidson), Red Springs, N.C.
Chase, N. Bruce (W.Va.), Lewisburg, W.Va.
Cottingham, Andrew J., Jr. (Duke), Laurinburg, N.C.
Dobson, John L. (Wesleyan), Arlington, Va.
Drury, Robert W. (Duke), West Palm Beach, Fla.
Dubin, David B. (Stanford), Lincoln, Calif.
Eisdorfer, Carl (NYU), Durham, N.C.
Friedel, Robert O. (Duke), Ramsey, N.J.
Fronstin, Michael H. (Brooklyn), Stanford, Conn.
Gabor, Andrew John (George Washington Univ.), Washington, D.C.
Given, Kenna S. (W. Va.), Clendenin, W. Va.
Goldman, Herbert P. (Duke), Cedarhurst, N.Y.
Gooding, Ronald S. (U.S. Mil. Academy), Tucson, Ariz.
Gorenberg, Richard (Wesleyan), Jersey City, N.J.
Green, James L. (Wake Forest), Wake Forest, N.C.
Grover, Frederick L. (Duke), Arlington, Va.
Hall, John H. (Oklahoma), Tallahassee, Fla.
Hannah, Frank T. (Georgia), Atlanta, Ga.
Harris, Benjamin S. H., III (Duke), Greenville, S.C.
Harris, Lee S. (Duke), Sarasota, Fla.
Hart, Julian Deryl, Jr. (Wash. & Lee), Durham, N.C.
Hecht, Manfred H. (Columbia), New York, N.Y.
Herring, Herbert J., Jr. (Duke), Durham, N.C.
Hinshaw, Arned L. (UNC), Burlington, N.C.
Holsinger, James W., Jr. (Duke), Goldsboro, N.C.
Hyde, Howard P. (Iowa State), Pierre, S.D.
Jacobson, Lenard E. (Duke), Woodbridge, N.J.
Johnson, Charles (Duke), Hickory, N.C.
Jones, Kenneth Lee (Adelphi), Brunswick, Md.
Kann, Herbert E., Jr. (Duke), Ft. Worth, Tex.
Karickhoff, John R. (Marshall), Spencer, W. Va.
Keranen Victor J. (Miami), Miami, Fla.
Keys, David N. (Wash. & Lee), Fredericksburg, Va.
Kornreich, George M. (Rochester), Harrison, N.Y.
Lanning, Joseph R. (Duke), Aiken, S.C.
Larimer, Alan (Dennison), Granville, Ohio

* Deceased. Died March 22, 1964.

LaRosa, John J. (Columbia), Pelham Manor, N.Y.
Lazarus, Stephen M. (Trinity), Brooklyn, N.Y.
Lewis, Kay R. (Duke), Ft. Recovery, Ohio
Liakos, William G. (U.S. Mil. Academy), Bayard, Neb.
Martin, David W., Jr. (M.I.T.), Palm Beach, Fla.
Mathews, Robert S. (UNC), Hertford, N.C.
Mayson, James Spearing (Univ. of the South), Dallas, Texas
McCutchan, Arthur D. (Davidson), Salisbury, N.C.
McGraw, Ralph, Jr. (Duke), Follansbee, W. Va.
McLaughlin, Joseph D., Jr. (George Washington), Mystic, Conn.
Nash, Martin A. (Duke), Winston-Salem, N.C.
Nickman, Steven L. (Princeton), Ventner, N.J.
Noble, Robert C. (UNC), Raleigh, N.C.
Paulson, David F. (Duke), Annapolis, Md.
Powell, James B. (VMI), Elon College, N.C.
Price, Thomas B. (Davidson), Florence, S.C.
Ravenel, Samuel D. (Duke), Greensboro, N.C.
Roberts, Stuart S. (City College, N.Y.), New York, N.Y.
Roe, Charles R. (Duke), Sparks, Md.
Ruben, Frederick L. (Duke), Rocky Mount, N.C.
Rubenstein, Carl J. (Princeton), Perth Amboy, N.J.
Ruffner, B. Winfred, Jr. (Duke), Arlington, Va.
Schmitz, George F. (Georgetown), Chicago, Ill.
Scott, William R. (Duke), Nazareth, Pa.
Serafin, Donald (Duke), Winter Park, Fla.
Shields, Ralph L. (Moravian), Bethlehem, Pa.
Shiner, Philip T. (VMI), Front Royal, Va.
Slaughter, Donald D. (Princeton), Baltimore, Md.
Springer, Leonard (Chicago), Roselle, N.J.
Steer, Michael L. (Duke), Denver, Colo.
Strause, N. Philip, III (Duke), Henderson, N.C.
Tankel, Robert H. (Johns Hopkins), Haledon, N.J.
Totten, Larry K. (W. Va.), Racine, W. Va.
Turner, James W., Jr. (Duke), Great Falls, S.C.
Vernon, Charles R. (Univ. of S.C.), Columbia, S.C.
Virgin, Charles E. (Duke), Miami, Fla.
Wilson, Thomas (Duke), Graham, N.C.
Winter, Robert H. (Wabash), LeRoy, Ohio
Wolk, Michael L. (Columbia), Bronx, N.Y.

## CLASS OF 1963 WITH INTERNSHIP APPOINTMENTS

Ayers, Charles Rausch (Charleston, S.C.), Duke, Durham, N.C.
Banghart, Harry Prizer (Philadelphia, Pa.), San Francisco Hosp., San Francisco, Calif.
Banta, Henry David (Oak Ridge, Tenn.), King County Hosp., Seattle, Wash.
Beamer, Yancey Brintle (Mount Airy, N.C.), N.C. Baptist Hosp., Winston-Salem, N.C.
Bicknell, William Jackson (Boston Mass.), Univ. of Oregon Hospitals, Portland, Oregon
Black, Craig Grayson (Asheville, N.C..), Roanoke Memorial Hosp., Roanoke, Va.
Bolton, John Charles (St. Paul, Va.), Montreal Children's Hosp., Montreal, Canada
Broughton, Joseph Otis, Jr. (Wilmington, N.C.), Duke, Durham, N.C.
Byrnes, Thomas Henderson, Jr. (Charlotte N.C.), Emory Univ. V. A. Hosp., Atlanta, Ga.
Carlton, Thomas Kern, Jr. (Salisbury, N.C.), Lackland Air Force Base, Texas
Carter, James Anderson (Gainesville, Ga.), Medical College of Va., Richmond, Va.
Carter, William Alvin (Norfolk, Va.), Duke, Durham, N.C.
Caskey, Charles Thomas (Columbia, S.C.), Duke, Durham, N.C.
Chang, Wallace Han-Jen (South Plainfield, N.J.), Duke, Durham, N.C.
Church, Clay Franklin (Chapel Hill, N.C.), Watts Hospital, Durham, N.C.
Cline, Robert Edward (Southern Pines, N.C.), The New York Hospital, New York, N.Y.
Doyle, Robert Alan (Fort Lauderdale, Fla), Lenox Hill Hosp., New York, N.Y.
Driver, Doyle, Jr. (Deland, Fla.), Duke, Durham, N.C.
Durrett, Ray Robert (Charleston, W. Va.), Duke, Durham, N.C.
Edwards, Elmo Stephen (Spring Hope, N.C.), Grady Memorial Hosp., Atlanta, Ga.
Emery, John Bloom, Jr. (Pitman, N.J.), Univ. of Utah Affiliated Hosp., Salt Lake City, Utah
Entman, Mark Lawrence (Jacksonville, Fla.), Johns Hopkins Hosp., Baltimore, Md.
Farrell, James Breckenridge (Carlsbad, N. Mex.), Univ. of Utah Affiliated Hosp., Salt Lake City, Utah
Fortney, Sidney Ray (Harlan, Ky.), Duke, Durham, N.C.
Gilbert, Walter Randolph, Jr. (Griffin, Ga.), Johns Hopkins Hosp., Baltimore, Md.
Glaser, Joel Stephen (Orlando, Fla.), George Washington Univ. Hosp., Washington, D.C.
Goldston, William Robert (Wake Forest, N.C.), George F. Geisinger Clinic, Danville, Pa.
Graham, Thomas Pegram, Jr. (Charlotte, N.C.), Children's Hosp. Med. Center, Boston, Mass.
Grant, George Redd, Jr. (Fayetteville, N.C.), Emory Univ. V. A. Hosp., Atlanta, Ga.
Gunlock, Howard David (Bethesda, Md.), George Washington Univ. Hosp., Washington, D.C.
Harrison, Robert Brent (Greer, S.C.), St. Anthony Hospital, Denver, Colo.
Haslett, Nancy Rose (Hialeah, Fla.), George Washington Univ. Hosp., Washington, D.C.
Haworth, Chester Carl, Jr. (High Point, N.C.), Duke, Durham, N.C.
Hoffman, Edward Peter (San Mateo, Calif.), Huntington Memorial Hosp., Pasadena, Calif.
Holland, Warren Frederick, Jr. (Columbia, South Carolina), Grady Memorial Hosp., Atlanta, Ga.
Holmes, Lewis Ball (McKenzie, Tenn.), Massachusetts General Hosp., Boston, Mass.

Hull, William Martin, Jr. (Rock Hill, S.C.), Duke, Durham, N.C.
Hutchinson, William Riley, IV (Deland, Fla.), Norfolk General Hosp., Norfolk, Va.
Hyman, Barry Noel (Miami, Fla.), Grady Memorial Hospital, Atlanta, Ga.
Imperato, Pascal John (Pleasantville, N.Y.), Syracuse Medical Center, Syracuse, N.Y.
James, Alton Everette, Jr. (Robersonville, N.C.), Univ. of Fla. Hosp., Gainesville, Fla.
James, Charles Marion (Albemarle, N.C.), Medical College of Va., Richmond, Va.
Jones, Jerry Lee (Raleigh, N.C.), Philadelphia General Hosp., Philadelphia, Pa.
Jones, Paul Wesley (Portland, Oregon), Emanuel Hospital, Portland, Oregon
Kapp, John Paul (Galax, Va.), Medical College of Va., Richmond, Va.
Kohler, Peter Ogden (Blacksburg, Va.), Duke, Durham, N.C.
Kramer, Arnold (Forest Hills, N.Y.), Vanderbilt Medical Center, Nashville, Tenn.
Kroe, Donald James (Baltimore, Md.), Duke, Durham, N.C.
Lewis, Edward Lloyd, Jr. (Greensboro, Ga.), Univ. of Va. Medical Center, Charlottesville, Va.
Liguori, Richard Andrew (Philadelphia, Pa), Methodist Hospital, Dallas, Texas
Long, Eugene Monroe, II (Burlington, N.C.), Univ. Hosp. and Hillman Clinic, Birmingham, Ala.
Lucey, Donald Truesdell (Daytona Beach, Fla.), Univ. of Va. Medical Center, Charlottesville, Va.
Mannarino, Emanuele Ugo (Durham, N.C.), Duke, Durham, N.C.
Marcus, Elliott Lee (Tampa, Fla.), Univ. of Alabama Medical Center, Birmingham, Ala.
Markham, Robert Wade (Apex, N.C.), Indiana Univ. Medical Center, Indianapolis, Ind.
Martin, Charles Richardson (Wilmington, N.C.), Univ. Hosp. and Hillman Clinic, Birmingham, Ala.
McBryde, Angus Murdoch, Jr. (Durham, N.C.), Univ. of Pa. Hospital, Philadelphia, Pa.
McMillan, William Owen, Jr. (Charleston W. Va.), Univ. of Va. Hospital, Charlottesville, Va.
Moore, Lawrence White, Jr. (Burkeville, Va.), Univ. of Colorado Medical Center, Denver, Colo.
Oliva, Philip Baird (Garfield, N.J.), Georgetown Univ. Hosp., Washington, D.C.
Poindexter, John Samuel, III (Savannah, Ga.), Eugene Talmadge Memorial Hosp., Augusta, Ga.
Pollard, Dulon Devon (Benson, N.C.), Watts Hospital, Durham, N.C.
Porter, John Marshall (Concord, N.C.), Duke, Durham, N.C.
Redding, James Oscar (Asheboro, N.C.), Cincinnati General Hosp. Cincinnati, Ohio
Robinson, Norman Jeffrey (Charleston, W. Va.), Brooke General Hosp., San Antonio, Texas
Runyan, Thomas Earl (Minneapolis, Minn.), Walter Reed Army Medical Center, Washington, D.C.
Safrit, Henry Faison (Beaufort, N.C.), Georgetown Univ. Hospital, Washington, D.C.
Saint-Amand, Nathan Eugene (Gaffney, S.C.), Univ. of Calif. Medical Center, San Francisco, Calif.
Sewell, Frank Kash, Jr. (Mt. Sterling, Ky.), Charity Hospital, New Orleans, La.
Shimm, Stephen Jay (Coral Gables, Fla.), Grady Memorial Hospital, Atlanta, Ga.
Sproles, Elijah Thomas, III (Kingsport, Tenn.), Queens Hospital, Honolulu, Hawaii
Stoever, Henry Von Hoff, III (Durham, N.C.), Medical College of Va., Richmond, Va.
Stumpf, Karl John (Durham, N.C.), Blodgett Memorial Hospital, Grand Rapids Mich.
Tabor, Owen Britt (Tifton, Ga.), Univ. of Pa. Hospital, Philadelphia, Pa.
Taylor, Waller Littlepage, Jr. (Virginia Beach, Va.), Medical College of Va., Richmond, Va.
Thomas, Raymond Lenoid (Columbia, S.C.), Medical College of S.C., Charleston, S.C.
Vanderbeek, Randall B. (Holland, Mich.), King County Hospital, Seattle, Wash.
Walston, Abe, II (Walstonburg, N.C.), Duke, Durham, N.C.
Young, Noel William, Jr. (Durham, N.C.), Duke, Durham, N.C.

## NO SEPTEMBER, 1963 GRADUATES

### MEDICAL STUDENTS
1963-1964

| | *Men* | *Women* | *Total* |
|---|---|---|---|
| Class of 1967 | 82 | 1 | 83 |
| Class of 1966 | 78 | 4 | 82 |
| Class of 1965 | 86 | 4 | 90 |
| Class of 1964 | 84 | 1 | 85 |
| | | | 340 |
| Graduate Medical Students | 311 | 12 | 323 |
| Paramedical Students | | | |
| Nursing | 0 | 299 | 299 |
| Anesthesia Nursing | 0 | 9 | 9 |
| Dietetic Interns | 0 | 9 | 9 |
| Physical Therapy | 8 | 18 | 26 |
| Hospital Administration | 19 | 0 | 19 |
| X-Ray Technology | 2 | 14 | 16 |
| Pharmacy Interns | 0 | 1 | 1 |
| | | | 379 |

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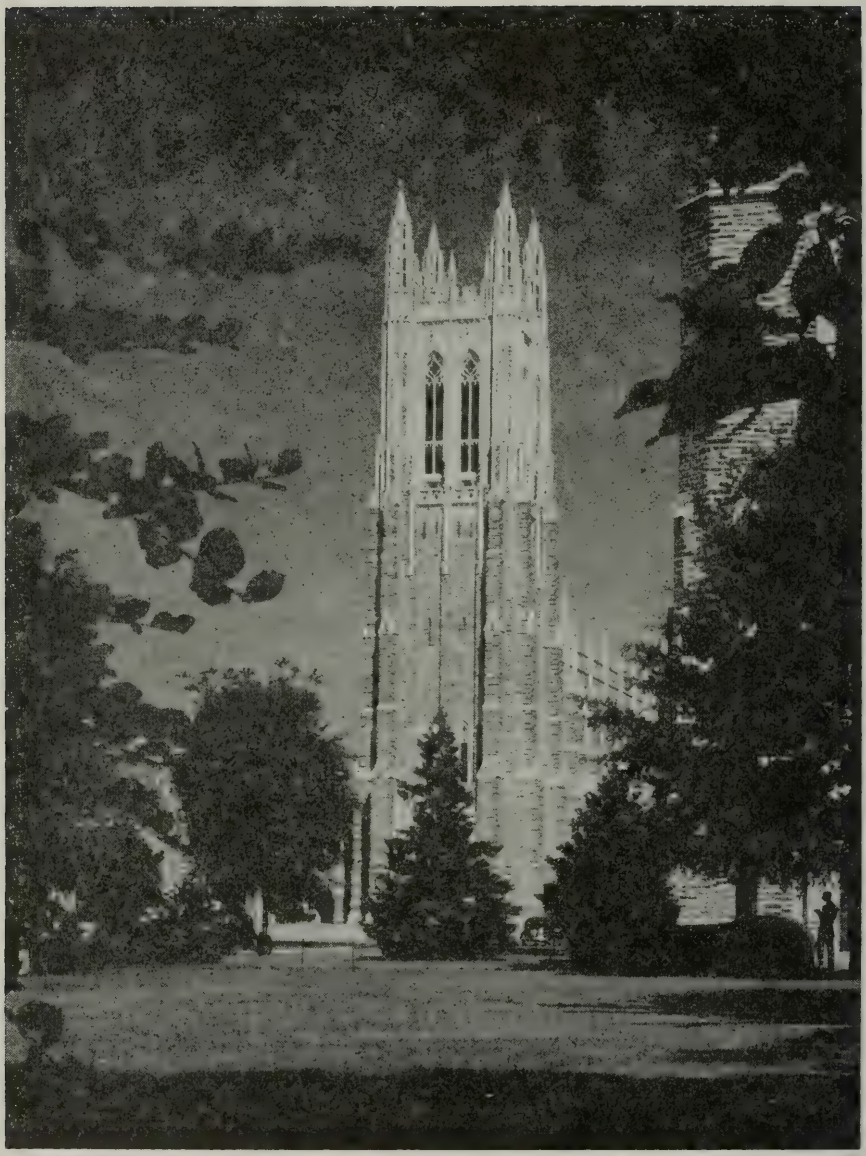
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## GENERAL CATALOGUE



ANNOUNCEMENTS FOR 1964-1965



THE CHAPEL

# BULLETIN

OF

# DUKE UNIVERSITY




## CATALOGUE NUMBER

## 1963-1964

ANNOUNCEMENTS FOR 1964-1965

DURHAM, NORTH CAROLINA

1964

"I request . . . that great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination, and application evincing a wholesome and real ambition for life."

—James B. Duke.

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# 1964

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# 1965

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# Calendar of the Colleges 1964-65

## 1964

| | | |
|---|---|---|
| September | 17 | Thursday. 7:30 p.m. Orientation Begins: Assemblies for all new students entering Trinity College, the Woman's College, and the College of Engineering. |
| September | 21 | Monday. Registration and matriculation of all students of Trinity College, the Woman's College, and the College of Engineering who have not pre-registered. |
| September | 23 | Wednesday. Final registration of pre-registered students. |
| September | 24 | Thursday. Fall semester classes begin. |
| November | 7 | Saturday. Last Day for reporting six-weeks grades. |
| November | 16-19 | Pre-registration for Spring Semester 1965. |
| November | 25 | Wednesday. 12:30 p.m. Thanksgiving recess begins. |
| November | 30 | Monday. 8:00 a.m. Classes are resumed. |
| December | 11 | Friday. Founders' Day. |
| December | 19 | Saturday. 12:30 p.m. Christmas recess begins. |

## 1965

| | | |
|---|---|---|
| January | 4 | Monday. 8:00 a.m. Classes are resumed. |
| January | 16 | Saturday. 12:30 p.m. Fall semester classes end. |
| January | 19 | Tuesday. Final examinations begin. |
| January | 29 | Friday. Final examinations end. |
| February | 2 | Tuesday. Registration and matriculation of new undergraduate students. |
| February | 3 | Wednesday. Last day for matriculation for the Spring Semester. |
| February | 4 | Thursday. 8:00 a.m. Spring Semester classes begin. |
| March | 17 | Wednesday. Last day for reporting six-weeks grades. |
| March | 27 | Saturday. 12:30 p.m. Spring recess begins. |
| April | 5 | Monday. 8:00 a.m. Classes are resumed. |
| April | 6-9 | Pre-registration for Summer Session and Fall of 1965. |
| May | 20 | Thursday. 5:00 p.m. Spring Semester classes end. |
| May | 22 | Saturday. Final examinations begin. |
| June | 2 | Wednesday. Final examinations end. |
| June | 5 | Saturday. Commencement begins. |
| June | 6 | Sunday. Commencement Sermon. |
| June | 7 | Monday. Graduating Exercises. |

# History

DUKE UNIVERSITY is built about a group of colleges which have their roots deep in the past. It was founded more than one hundred years ago when a number of earnest citizens from Randolph and adjacent counties assembled in a log school house to organize an educational society. They wished to provide lasting support for the local academy founded a few months before by an energetic son of North Carolina, Brantley York.

Moved by "no small share of philanthropy and patriotism," these men set forth their belief "that ignorance and error are the bane not only of religious but also of civil society" and that they "rear up almost an impregnable wall between man and the happiness he so ardently pants after." On that basis they formally adopted a constitution for the Union Institute Society. Thus in February, 1839, the academy became Union Institute. Twelve years later the Institute was reorganized as Trinity College. In 1892 it was moved from the fields of Randolph County to the growing city of Durham. Thirty-two years later the College grew into Duke University. With increasing enrollment and the development of specialized needs the Woman's College was formed in 1925 and the College of Engineering in 1938.

As the University developed around the core of the colleges, the Graduate School of Arts and Sciences expanded in number of students and in areas of instruction and research; the School of Law of Trinity College became the Duke University School of Law; and other professional schools were established. The Divinity School was organized in 1926, the School of Medicine, and the School of Nursing in 1930, and the School of Forestry in 1938.

From academy to university the basic principles have remained constant. The University motto, *Eruditio et Religio,* reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of students the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities.

# Government

## 1. THE INDENTURE OF TRUST BY WHICH THE UNIVERSITY WAS CREATED

Among the provisions of James B. Duke's Indenture of Trust was an educational institution to be known as Duke University, to the building and support of which he made provision at the time of execution of the Indenture and later by additions thereto by the operation of his Will. In respect to Duke University the Indenture contains the following provisions:

I. (In Article FOURTH) The Trustees hereunder are hereby authorized and directed to expend as soon as reasonably may be not exceeding Six Million Dollars of the corpus of this trust in establishing at a location to be selected by them within the State of North Carolina an institution of learning to be known as Duke University, for such purpose to acquire such land and erect and equip thereon such buildings according to such plans as the Trustees may in their judgment deem necessary and adopt and approve for the purpose to cause to be formed under the laws of such state as the Trustees may select for the purpose a corporation adequately empowered to own and operate such properties under the name of Duke University as an institution of learning according to the true intent hereof, and convey to such corporation when formed the said lands, buildings and equipment upon such terms and conditions as that such corporation may use the same only for such purposes of such university and upon the same ceasing to be so used then the same shall forthwith revert and belong to the Trustees of this trust as and become a part of the corpus of this trust for all the purposes thereof.

However, should the name of Trinity College, located at Durham, North Carolina, a body politic and incorporate, within three months from the date hereof (or such further time as the Trustees hereof may allow) be changed to Duke University, then, in lieu of the foregoing provisions of this division "FOURTH" of this Indenture as a memorial to his father, Washington Duke, who spent his life in Durham and whose gifts, together with those of Benjamin N. Duke, the brother of the party of the first part, and of other members of the Duke family, have so largely contributed toward making possible Trinity College at that place, he directs that the Trustees shall expend of the corpus of this trust as soon as reasonably may be a sum not exceeding Six Million Dollars in expanding and extending said University, acquiring and improving such lands, and erecting, removing, remodeling and equipping such buildings, according to such plans, as the Trustees may adopt and approve for such purpose to the end that said Duke University may eventually include Trinity College as its undergraduate department for men, a School of Religious Training, a School for Training Teachers, a School of Chemistry, a Law School, Co-ordinate College for Women, a School of Business Administration, a Graduate School of Arts and Sciences, a Medical School and an Engineering School, as and when funds are available.

II. (In Article FIFTH) Thirty-two per cent of said net amount not retained as aforesaid for addition to the corpus of this trust shall be paid to that Duke University for which expenditures of the corpus of the trust shall have been made by the Trustees under the "Fourth" division of this Indenture so long as its name shall be Duke University and it shall not be operated for private gain, to be utilized by its Board of Trustees, in defraying its administration and operating expenses, increasing and improving its facilities and equipment, the erection and

enlargement of buildings and the acquisition of additional acreage for it, adding to its endowment or in such other manner for it as the Board of Trustees of said institution may from time to time deem to be of its best interests, provided that in case such insitutions shall incur any expense of liability beyond provisions already in sight to meet same, or in the judgment of the Trustees under this Indenture be not operated in a manner calculated to achieve the results intended hereby the Trustees under this Indenture may withhold the whole or any part of such percentage from said institution so long as such character of expense or liabilities or operation shall continue, such amounts so withheld to be in whole or in part either accumulated and applied to the purposes of such University in any future year or years, or utilized for the other objects of this Indenture, or added to the corpus of this trust for the purpose of increasing the principal of the trust estate, as the Trustees may determine.

III. (In Article SEVENTH) I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines, is, next to religion, the greatest civilizing influence. I request that this institution secure for its officers, trustees, and faculty, men of such outstanding character, ability, and vision as will insure its attaining and maintaining a place of real leadership in the educational world, and that great care and discrimination be exercised in admitting as students only those previous records show a character, determination, and application evincing a wholesome and real ambition for life. And I advise that the courses at this institution be arranged, first, with special reference to the training of preachers, teachers, lawyers and physicians, because these are most in the public eye, and by precept and example can do most to uplift mankind, and second, to instruction in chemistry, economics, and history, especially the lives of the great of earth, because I believe that such subjects will most help to develop our resources, increase our wisdom and promote human happiness.

IV. (In Article THIRD) As respects any year or years and any purpose or purposes for which this trust is created (except the payments hereinafter directed to be made to Duke University) the Trustees in their uncontrolled discretion may withhold the whole or any part of said incomes, revenues and profits which would otherwise be distributed under the "Fifth" division hereof, and either (1) accumulate the whole or any part of the amount so withheld for expenditures (which the Trustees are hereby authorized to make thereof) for the same purpose in any future year or years, or (2) add the whole or any part of the amounts so withheld to the corpus or the trust, or (3) pay, apply and distribute the whole or any part of said amounts to and for the benefit of any one or more of the other purposes of this trust, or (4) pay, apply and distribute the whole or any part of said amounts to or for the benefit of any such like charitable, religious or educational purpose within the State of North Carolina or the State of South Carolina, or any such like charitable hospital purpose which shall be selected therefor by Trustees called for the purpose, complete authority and discretion in and for such selection and utilization being hereby given the Trustees in the premises.

## 2. THE CHARTER OF THE UNIVERSITY

SECTION 1. That A. P. Tyer, J. H. Southgate, B. N. Duke, G. A. Oglesby, V. Ballard, J. A. Long, J. F. Bruton, J. N. Cole, F. A. Bishop, J. G. Brown, C. W. Toms, J. W. Alspaugh, W. R. Odell, J. A. Gray, F. Stikeleather, Kope Elias, S. B. Turrentine, P. H. Hanes, T. F. Marr, G. W. Flowers, M. A. Smith, R. H. Parker, W. J. Montgomery, F. M. Simmons, O. W. Carr, R. A. Mayer, N. M. Jurney, Dred Peacock, B. B. Nicholson, W. G. Bradsher, E. T. White, T. N. Ivey, J. B. Hurley, R. L. Durham, W. C. Wilson, and their associates and successors shall be, and continue as they have been, a body politic and corporate under the name and style of DUKE UNIVERSITY, and under such name and style shall have perpetual existence and are hereby invested with all the property and rights of property which now belong to the said corporation, and said corporation shall henceforth and perpetually, by the name and style of DUKE UNIVERSITY, hold and use

all the authority, privileges, and possessions it had or exercised under any former title and name, and be subject to all recognized legal liabilities and obligations now outstanding against such corporations.

SEC. 2. That such corporation is authorized to receive and hold by gift, devise, purchase or otherwise, property, real and personal, to be held for the use of said University and its dependent schools or for the use of either or both (as may be designated in the conveyance or will).

SEC. 3. That the Trustees shall be thirty-six in number of whom twelve shall be elected by the North Carolina Conference of the M. E. Church, South; twelve by the W. N. C. Conference of the said church; and twelve by the graduates of said University; *Provided*, however, That no person shall be elected a Trustee till he has first been recommended by a majority of the Trustees present at a regular meeting; and the Trustees shall have power to remove any member of their body who may remove beyond the boundary of the State or who may refuse or neglect to discharge the duties of a Trustee. The term of office of Trustees shall be six years, and they shall be so arranged that four Trustees shall be elected by each Conference and four by the graduates every two years. The Trustees shall regulate by bylaws the manner of election of Trustees to be chosen by the graduates. Should there exist a vacancy by death, resignation, or otherwise of any Trustee, the same shall be filled for the unexpired term by the Board of Trustees. That the present Trustees shall continue and remain in office during the term for which they have been heretofore respectively elected.

SEC. 4. That the said corporation shall be under the supervision, management and government of a president and such other persons as said Trustees may appoint; the said president, with the advice of other persons so appointed, shall from time to time make all needful rules and regulations for the internal government of said University and prescribe the preliminary examinations and terms and conditions on which pupils shall be received and instructed.

SEC. 5. That said Trustees shall have power to make such rules, regulations, bylaws not inconsistent with the Constitution of the United States and of this State, as may be necessary for the good government of said University and management of the property and funds of the same.

SEC. 6. That the Trustees shall have power to fix the time of holding their annual and other meetings, to elect a president and professors for said University, to appoint an executive committee to consist of seven members, which committee shall control the internal regulations of said University and fix all salaries and emoluments, and to do all other things necessary for an institution of learning not inconsistent with the laws of this State and of the United States.

SEC. 7. That the Faculty and Trustees shall have the power of conferring such degrees and marks of honor as are conferred by colleges and universities generally; and that five Trustees shall be a quorum to transact business.

SEC. 8. That all laws and parts of laws or of the charter heretofore granted which are in conflict with this act are hereby repealed.

SEC. 9. That this act shall be in force from and after its ratification and acceptance by the Board of Trustees.

## 3. THE BYLAWS OF THE UNIVERSITY

### ARTICLE I

### AIMS

1. THE AIMS OF DUKE UNIVERSITY are to assert a faith in the eternal union of knowledge and religion set forth in the teachings and character of Jesus Christ, the Son of God; to advance learning in all lines of truth; to defend scholarship against all false notions and ideals; to develop a Christian love of freedom and truth; to promote a sincere spirit of tolerance; to discourage all partisan and sectarian strife; and to render the largest permanent service to the individual, the state, the nation, and the church. Unto these ends shall the affairs of this University always be administered.

### ARTICLE II

### BOARD OF TRUSTEES

1. POWERS. All powers of the University shall be vested in a Board of Trustees consisting of thirty-six members.

2. NOMINATION AND ELECTIONS. The Trustees shall be elected as follows, twelve by the North Carolina Conference of the Methodist Church; twelve by the Western North Carolina Conference of the Methodist Church; and twelve by the General Alumni Association of Duke University.

The Executive Committee, acting as a committee on nominations, shall report to the Board the names of the persons whom it nominates for election as Trustees. The Board, by majority vote of the Trustees present at a regular meeting, shall recommend the persons to be elected Trustees and submit its recommendations to the appropriate Conference of the Methodist Church and the General Alumni Association.

No person who shall have attained the age of seventy years shall be elected a Trustee.

3. TERM. The term of office of a Trustee shall be six years, beginning on the first day of January following the election, and the terms shall be so arranged that four Trustees shall be elected by each Conference and four by the General Alumni Association every two years.

4. VACANCIES. Any vacancy in the membership of the Board of Trustees shall be filled for the unexpired term by a majority vote of the Trustees present at a regular meeting of the Board.

5. RETIREMENT. A Trustee who attains or has attained the age of seventy years shall retire at the end of the term for which he has been elected.

6. EMERITUS. The Board of Trustees may elect a retiring or resigning Trustee a Trustee Emeritus. Trustees Emeriti shall be entitled to receive notice of all meetings of the Board and attend and participate in such meetings, but shall not have the right to vote.

7. REMOVAL. Any Trustee who may refuse or neglect to discharge the duties of Trustee may be removed by the affirmative vote of three-fourths of the members of the entire Board of Trustees.

### ARTICLE III

### MEETINGS OF THE BOARD

1. ANNUAL MEETING. The annual meeting of the Board of Trustees shall be held on the Saturday before the first Monday in June.

2. REGULAR MEETINGS. Regular meetings of the Board of Trustees shall be held on the first Friday in November and March.

3. SPECIAL MEETINGS. Special meetings shall be held upon the call of the Chairman, or upon written request of twelve or more Trustees addressed to the Secretary, with a copy to the Chairman specifying the business to be transacted at the meeting.

4. NOTICE. The Secretary shall give at least five days' notice to each member of the Board stating the time and place of all meetings, and the purpose of any special meeting.

5. PLACE. All meetings of the Board of Trustees shall be held at Duke University in the City of Durham, North Carolina, except that the Trustees by vote, or written assent, of a majority of the then members of the Board may designate another place for any meeting.

6. QUORUM. A majority of the then members of the Board of Trustees shall be a quorum for the transaction of business.

### ARTICLE IV

### OFFICERS OF THE BOARD

1. OFFICERS OF THE BOARD. The officers of the Board of Trustees shall be a Chairman, a Vice Chairman, and a Secretary.

2. ELECTION. The officers of the Board of Trustees shall be elected at its

annual meeting for a term of one year or until their successors are elected and qualified.

3. DUTIES.

a. The Chairman shall preside at all meetings of the Board, shall represent the Trustees at public meetings of the University, and shall be a member of and Chairman of the Executive Committee.

b. The Vice Chairman shall perform the duties of the Chairman in the absence or disability of the Chairman, or in the event of a vacancy in that office.

c. The Secretary of the University shall also be the Secretary of the Board of Trustees. He shall record the minutes of all meetings of the Board and its Executive Committee, and shall have custody of the Charter, Bylaws, minutes, records and other documents of the Board and its Committees. The Secretary shall send a copy of the minutes to each member of the Board promptly after each meeting of the Board and of the Executive Committee.

4. VACANCIES. A vacancy in any office of the Board of Trustees may be filled for the unexpired term by the Board of Trustees.

## ARTICLE V

## COMMITTEES OF THE BOARD

1. COMMITTEES. The Standing Committees of the Board shall be:

1. Executive Committee
2. Building and Grounds Committee
3. Committee for Institutional Advancement
4. University Committee.

The Board of Trustees may authorize other committees from time to time.

The Committees of the Board of Trustees shall have the powers and duties set forth in these Bylaws and such other powers and duties as the Board may delegate to them. They shall exercise their powers and perform their duties subject to the direction and approval of the Board. They may from time to time make recommendations to the Board for the establishment of new policies or any changes in existing policies.

2. MEMBERSHIP. At each annual meeting the Board of Trustees shall elect the members of the four Standing Committees to serve for the ensuing year. The Chairman of the Board of Trustees and the President of the University shall be members of the Executive Committee and shall be ex officio, non-voting members of all other Committees of the Board of Trustees.

Insofar as practical membership on the Standing Committees should be rotated.

3. VACANCIES. Any vacancy in the membership of a Standing Committees shall be filled by the Chairman of the Board of Trustees.

4. MEETINGS. Each Standing Committee shall meet at such times and places and upon such notice as it may determine, and shall file a copy of the minutes of each meeting with the Secretary of the University.

5. QUORUM. A majority of the then members of a Standing Committee shall be a quorum for the transaction of business.

## ARTICLE VI

## EXECUTIVE COMMITTEE

1. MEMBERSHIP. The Chairman of the Board, the President of the University, and five Trustees, three of whom shall also be Trustees of The Duke Endowment nominated by The Endowment, shall constitute the Executive Committee of this Board.

2. POWERS AND DUTIES. The Executive Committee shall:

a. Control the internal regulations of the University.

b. Fix all salaries, emoluments, and other allowances.

c. Approve annual budget and authorize the annual audit.

d. Appoint an Investment Committee of not less than five members, at least two of whom shall be Trustees, with such powers and duties as may be assigned to it by the Executive Committee.

e. Subject to the provisions of the Charter and these By-Laws, exercise all powers of the Board of Trustees in the interims between meetings of the Board.
f. Report its actions to the Board of Trustees.
g. Act as the Nominating Committee for the election of Trustees.

### ARTICLE VII

### BUILDING AND GROUNDS COMMITTEE

1. MEMBERSHIP. The Building and Grounds Committee shall be composed of not less than five Trustees and the Vice President for Business and Finance ex officio.

2. POWERS AND DUTIES. The Building and Grounds Committee shall consider proposals by the President for:

a. Plans for the development and use of the University's buildings, grounds, and utilities devoted to educational purposes.
b. The kind, location and plans for all buildings, utilities and improvements, including roads and parking areas.
c. Architects and contractors.

The Committee shall have authority to accept all new construction on behalf of the University but shall not incur any expenses not previously authorized by the Board of Trustees or the Executive Committee.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

### ARTICLE VIII

### COMMITTEE FOR INSTITUTIONAL ADVANCEMENT

1. MEMBERSHIP. The Committee for Institutional Advancement shall be composed of not less than five Trustees and the Vice President for Institutional Advancement ex officio.

2. POWERS AND DUTIES. The Committee for Institutional Advancement shall consider proposals by the President for policies and plans concerning the financial development, fund raising, public relations, and alumni affairs of the University.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

### ARTICLE IX

### UNIVERSITY COMMITTEE

1. MEMBERSHIP. The University Committee shall be composed of not less than twelve Trustees and the Provost ex officio.

2. POWERS AND DUTIES. The University Committee shall:

a. Serve as a Board of Visitors to the University.
b. Serve as a Committee on Earned Degrees.
c. Consider proposals by the President for the educational role of each school, college, and unit of the University and for the University as a whole, the admission of students at all levels, student life and activities, educational and research programs, and the coordination of all educational activities.
d. Designate five of its members, who, along with an equal number of faculty members designated by the President, and the President ex officio, shall serve as a Committee on Honorary Degrees to make recommendations to the University Faculty and Board of Trustees.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

### ARTICLE X

### OFFICERS OF THE UNIVERSITY

1. The Officers of the University shall be a President, a Provost, a Vice President for Business and Finance, a Vice President for Institutional Advancement,

one or more other Vice Presidents, a Treasurer, a Secretary, a University Counsel, and such other officers as the Board of Trustees may elect. One person may hold more than one office, except that the officers of President and Secretary may not be held by the same person.

2. These Officers shall be elected by the Board of Trustees at its annual meeting for a term of one year and shall serve until their successors are elected and have taken office.

3. A vacancy in any office of the University may be filled, for the unexpired term, by the Board of Trustees or by the Executive Committee.

## ARTICLE XI
## PRESIDENT

1. The President shall be the chief educational and administrative officer of the University. He shall be responsible to the Board of Trustees for the supervision, management, and government of the University, and for interpreting and carrying out the policies of the Board of Trustees. He shall have the powers and duties set forth in the Charter and in these Bylaws, and such other powers and duties as the Board of Trustees shall delegate to him.

2. He, or someone designated by him, shall preside at all academic functions and represent the University before the public.

3. He shall preside at all meetings of the University Faculty. He may veto any action taken by the University Faculty or any action taken by the faculty of any college or school in the University and state his reasons for such action.

4. He shall submit a proposed annual budget for the University to the Executive Committee prior to the beginning of the fiscal year covered by the budget.

5. He shall submit to the Board of Trustees an annual report on the condition, operations and needs of the University.

6. He shall recommend to the Board of Trustees persons to be officers of the University other than the President.

## ARTICLE XII
## PROVOST

1. The Provost shall be an executive officer of the University, under the President, responsible for all educational affairs and activities, including research and the University Hospital, and for all aspects of student activity and welfare. He shall have the powers and duties assigned to him by the President and shall report to the President.

2. He shall be a member of the faculty of each college and school, and ex officio a member of each committee (other than Committees of the Board of Trustees) or other body concerned with matters for which he is responsible.

3. He shall receive recommendations developed by the faculty and educational officers for consideration and recommendation to the President.

4. He shall assume the powers and duties of the President during the incapacity or absence of the President or in case of a vacancy in that office.

## ARTICLE XIII
## VICE PRESIDENT FOR BUSINESS AND FINANCE

1. The Vice President for Business and Finance shall be an executive officer, under the President, responsible for all business and finance, including accounting and auditing, preparation of budgets, fiscal planning, and operating of services of the University. He shall have the powers and duties assigned to him by the President and shall report to the President.

2. He shall have custody of all records, contracts, agreements, deeds, and other documents of the University or relating to its operations or properties, except minutes of meetings.

3. He shall submit to each regular meeting of the Executive Committee a report on those aspects of the finances of the University that the Executive Committee may require, and shall submit to the Board of Trustees at the end of each fiscal year on account of all receipts and disbursements for the preceding

year and a statement in such detail as the Board of Trustees may require of the financial condition of the University at the end of such year.

4. He and the personnel under him shall be bonded to the extent determined by the Executive Committee.

### ARTICLE XIV
### VICE PRESIDENT FOR INSTITUTIONAL ADVANCEMENT

The Vive President for Institutional Advancement shall be an executive officer, under the President, responsible for all public and alumni relations, fund raising, and long range planning and development. He shall have the powers and duties assigned to him by the President and shall report to the President.

### ARTICLE XV
### TREASURER

1. The Treasurer shall report to the President or such officer of the University as the President may direct and shall has the powers and duties assigned to him by the President or such other officer.

2. He may receive and disburse investment funds and purchase, sell, or otherwise dispose of investment securities pursuant to the directions of the Executive Committee or Investment Committee, as the case may be.

3. He and the personnel under him shall be bonded to the extent determined by the Executive Committee.

### ARTICLE XVI
### SECRETARY

1. The Secretary, under the President, shall have all of the powers and duties set forth in these Bylaws and the powers and duties commonly incident to his office. He also shall have the powers and duties assigned to him by the President and shall report to the President.

2. He shall be the custodian of the seal of the corporation and shall affix and attest to same on all duly authorized contracts, deeds, and other documents.

3. He shall maintain an official roster setting forth the status of all persons employed by the University.

### ARTICLE XVII
### UNIVERSITY COUNSEL

The University Counsel shall be the legal advisor to the University and shall be responsible for all matters of a legal nature concerning the University, including litigation, preparation or approval of all contracts, deeds, conveyances, or other documents.

### ARTICLE XVIII
### FACULTY

1. The University Faculty shall be composed of the President, the Provost, the Vice Presidents, the Secretary (who shall also be the Secretary of the Faculty), all deans, professors, associate professors, and assistant professors, Registrar, and the University Librarian, and such other persons as may be designated by the President and approval by the Executive Committee or the Board of Trustees.

2. The University Faculty shall be responsible for the conduct of instruction and research in the various colleges and schools in the University. It may also consider and make recommendations to the President regarding any and all phases of education at the University.

3. The University Faculty shall approve and recommend to the Board of Trustees the persons it deems fit to receive degrees or other marks of distinction, and the establishment of any new degree or diploma.

4. The University Faculty may organize and exercise its functions through appropriate councils, committees, or other bodies.

5. Each college and school in the University may have a faculty of its own, which shall be composed of the President, the Provost, the Secretary, and all

members of the University Faculty in the particular college or school. Each such faculty shall function under the President and other offices of educational administration and subject to the regulations of the University Faculty.

### ARTICLE XIX
### APPOINTMENTS, PROMOTIONS AND TENURE

1. Members of the University Faculty shall be elected, appointed, or promoted by the Board of Trustees or the Executive Committee upon the recommendation of the Provost, with the approval of the President.

2. Members of the University Faculty, above the rank of instructors, shall have tenure after seven years of continuous service at the University, or such shorter period as may be determined for individual cases, by the Board of Trustees or the Executive Committee; provided that any such person shall be subject to dismissal by the Board of Trustees or the Executive Committee for misconduct or neglect of duty.

### ARTICLE XX
### SABBATICAL LEAVES

1. Each member of the University Faculty of the rank of professor, associate professor, or assistant professor shall be eligible for sabbatical leave after each six years service to the University. Such leave may be taken for a full year at half salary or a half year at full salary.

2. Sabbatical leave may be granted by the Executive Committee upon the written recommendation of the dean of the appropriate college or school, approved by the Provost and the President.

### ARTICLE XXI
### RETIREMENT

1. All officers and employees of the University who are eligible for or participate in the TIAA Plan and who would attain the age of seventy years prior to March 1 of a given academic year shall retire at the end of the preceding academic year and all such officers and employees who attain the age of seventy years on or after March 1 in a given academic year shall retire at the end of such academic year.

2. The retirement and annuity plan adopted by the University on October 1, 1925, is hereby amended in those respects required to conform with the provisions of the Bylaws.

### ARTICLE XXII
### FISCAL YEAR, ACADEMIC YEAR, AND ACADEMIC CALENDAR

1. The fiscal year of the University shall commence on July 1 and end on the following June 30.

2. The academic year of the University shall commence on September 1 and end on the following August 31.

3. The President shall establish the academic calendar for each academic year, except that graduation exercises shall take place on the first Monday in June of each year.

### ARTICLE XXIII
### AMENDMENT OF BYLAWS

These Bylaws may be amended at any regular meeting of the Board of Trustees by the affirmative vote of two-thirds of the then membership of the Board, provided that the proposed amendment is mailed by the Secretary of the Board to each member at least twenty days before the meeting.

# Officers of the University for the Year 1964-65

## *The Corporation*

### THE UNIVERSITY TRUSTEES

(The date in parentheses indicates the year of election.)

#### Trustees whose term expires December 31, 1965

| | |
|---|---|
| George Venable Allen (1961) | Washington, D. C. |
| A. Merrimon Cuninggim (1963) | St. Louis, Mo. |
| Benjamin Everett Jordan (1943) | Saxapahaw, N. C. |
| George Crews McGhee (1962) | Bonn, Germany |
| Marshall I. Pickens (1963) | Charlotte, N. C. |
| Henry Gibbons Ruark (1962) | Rocky Mount, N. C. |
| Walter McGowan Upchurch, Jr. (1964) | New York, N. Y. |
| Charles Byrd Wade, Jr. (1964) | Winston-Salem, N. C. |

*From the Alumni*

| | |
|---|---|
| Thomas A. Aldridge (1959) | Naples, Fla. |
| Kenneth Millikan Brim (1952), *Vice Chairman* | Greensboro, N. C. |
| Edgar Harrison Nease (1950) | Winston-Salem, N. C. |
| George Robert Wallace (1954) | Morehead City, N. C. |

#### Trustees whose term expires December 31, 1967

| | |
|---|---|
| Calvin Bryan Houck (1951) | Roanoke, Va. |
| Edwin Lee Jones (1945) | Charlotte, N. C. |
| Ben Neely Miller, Jr. (1958) | Columbia, S. C. |
| Frank Odell Sherrill (1959) | Charlotte, N. C. |
| James Raymond Smith (1934) | Mt. Airy, N. C. |
| Thomas Fuller Southgate, Jr. (1959) | Winston-Salem, N. C. |
| Estelle Flowers Spears (1951) | Durham, N. C. |
| Richard Elton Thigpen (1953) | Charlotte, N. C. |

*From the Alumni*

| | |
|---|---|
| Benjamin Ferguson Few (1941) | Southport, Conn. |
| Julius Welch Harriss (1947) | High Point, N. C. |
| Robert Henry Pinnix (1959) | Gastonia, N. C. |
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*Assistant Professor of Experimental Surgery* — 1011 Anderson Street

Walter Boris Cherney (1957), M.D. (McGill)
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Clifton Cherpack (1958), Ph.D. (Johns Hopkins)
*Professor of Romance Languages* — 235 Forestwood Drive

Arthur Christakos (1963), M.D. (South Carolina)
*Associate in Obstetrics and Gynecology*

Austin H. Church (1963), M.S. (New York)
*Visiting Professor of Mechanical Engineering* — 624 Pamlico Street

James R. Clapp (1963), M.D. (North Carolina)
*Associate in Medicine* — 904 West Murray Avenue

C. M. H. Clark (1963), M.A. (Melbourne)
*Visiting Professor of History* — 917 Green Street

Elon Henry Clark (1934)
*Professor of Medical Art and Illustration* — 801 West Maynard Avenue

Kenneth Willis Clark (1931), B.D., Ph.D. (Chicago)
*Professor of New Testament* — 1308 West Markham Avenue

Lelia Ross Clark (1949), M.A. (Columbia)
*Professor of Nursing Service* — 1506 Woodland Drive

Romane Lewis Clark (1953), Ph.D. (Iowa)
*Associate Professor of Philosophy* — 2511 Sevier Street

Robert B. Claytor (1964), Th.M. (Duke)
*Instructor in Pastoral Care* — 854 Louise Circle

James T. Cleland (1945), Th.D. (Union)
*James B. Duke Professor of Preaching* — 2117 Campus Drive

Frank W. Clippinger (1957), M.D. (Washington)
*Associate Professor of Orthopedic Surgery* — 1302 Oakland Avenue

Paul M. Clogan (1961), Ph.D. (Illinois)
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Sanford I. Cohen (1957), M.D. (Chicago)
*Associate Professor of Psychiatry* — 1334 Welcome Circle

Robert Taylor Cole (1935), Ph.D. (Harvard)
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*Instructor in Nursing* — 1309-C Leon Street

Joel G. Colton (1947), Ph.D. (Columbia)
*Professor of History* — 2801 Dogwood Road

Robert Merle Colver (1953), Ed.D. (Kansas)
*Associate Professor of Education* — 2720 Circle Drive

Norman Francis Conant (1935), Ph.D. (Harvard)
*James B. Duke Professor of Microbiology* — Route 3, Box 62 Garrett Road

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Thomas Howard Cordle (1950), Ph.D. (Yale)
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Samuel Owen Cornwell (1960), M.D. (Minnesota)
*Assistant Professor of Pediatrics* — Murdoch School Butner, N. C.

John D. Costlow (1959), Ph.D. (Duke)
*Assistant Professor of Zoology* — 201 Ann Street Beaufort, N. C.

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*Instructor in Zoology* — Apartment 27 301 Swift Avenue

Robert Calvin Cox (1942), M.A. (Columbia)
*Associate Professor of Physical Education* — 1913 University Road

William H. Cracknell (1963), B.S. (Mount Union)
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*Associate in Psychiatry* — Highland Hospital Asheville, N. C.

Robert Irwin Crane (1961), Ph.D. (Yale)
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Bruce C. Cresson (1963), Th.M. (Southeastern Baptist Theological Seminary)
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Herbert Crovitz (1963), Ph.D. (Duke)
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Charles Culver (1963), Ph.D. (Duke)
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Brainerd Currie (1961), J.S.D. (Columbia)
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*Professor of History* — 4418 Guess Road

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Ollie Belle Davenport (1961), M.S.N. (Western Reserve)
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Eugene A. Davidson (1957), Ph.D. (Columbia)
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Mrs. Susan Coons Dees (1939), M.D. (Johns Hopkins)
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Wiley Davis Forbus (1930), M.D. (Johns Hopkins)
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*Assistant Professor of Pediatrics* — 1212 Woodburn Road

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Charles H. Frenzel (1956), B.A. (Duke)
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Samuel J. Friedberg (1960), M.D. (Pennsylvania)
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John A. Friedrich (1963), Ph.D. (Michigan State)
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Rhett Truesdale George, Jr. (1957), M.S.E.E. (Florida)
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Nicholas G. Georgiade (1951), D.D.S., M.D. (Duke)
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*Associate Professor of Economics* 2707 Sevier Street

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Sherwood Githens, Jr. (1962), Ph.D. (North Carolina)
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James F. Glenn (1963), M.D. (Duke)
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Craufurd D. Goodwin (1962), Ph.D. (Duke)
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Ralph J. Gorten (1963), M.D. (Pennsylvania)
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Robert Lee Green, Jr. (1960), M.D. (Hahnemann)
*Associate Professor of Psychiatry* — 3700 Hermine Street

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*Assistant Professor of Biochemistry* — 1014 Norwood Avenue

Joseph C. Greenfield (1962), M.D. (Emory)
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Robert A. Gregg (1961), M.D. (South Carolina)
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Eugene Greuling (1948), Ph.D. (Indiana)
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Keith Sanford Grimson (1930-42; 1945), M.D. (Rush)
*Professor of Surgery* — 3313 Devon Road

Egil Grislis (1959), B.D., Ph.D., (Yale)
*Assistant Professor of Historical Theology* — 2323 Englewood Avenue

Paul Magnus Gross (1919), Ph.D. (Columbia)
*William Howell Pegram Professor of Chemistry* — 3816 Dover Road

Samson R. Gross (1960), Ph.D. (Columbia)
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Julia Rebecca Grout (1924), M.S. (Wellesley)
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Walter R. Guild (1960), Ph.D. (Yale)
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J. Caulie Gunnells (1962), M.D. (South Carolina)
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Norman Guttman (1951), Ph.D. (Indiana)
*Professor of Psychology* — 201 Woodridge Drive

Donald B. Hackel (1960), M.D. (Harvard)
*Professor of Pathology* — 2535 Perkins Road

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John Hamilton Hallowell (1942), Ph.D. (Princeton)
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William Baskerville Hamilton (1936), Ph.D. (Duke)
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Philip Handler (1939), Ph.D. (Illinois)
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John Kennedy Hanks (1954), M.A. (Columbia)
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Charles M. Harman (1961), Ph.D. (Wisconsin)
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Ellwood Scott Harrar (1936), Ph.D. (Syracuse)
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Paul Harrawood (1956), M.S. in C.E. (Missouri)
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Calvin Bryce Hoover (1925), Ph.D. (Wisconsin)
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Everett Harold Hopkins (1961), A.M. (Pennsylvania)
*Professor of Education* — 2016 Campus Drive

Edward Charles Horn (1946), Ph.D. (Princeton)
*Professor of Zoology* — 818 East Forest Hills Boulevard

Paul Horowicz (1961), Ph.D. (Johns Hopkins)
*Associate Professor of Physiology* — 216 West Woodridge Drive

Theresa Elizabeth Horton (1964), M.S.N.E. (Pittsburgh)
*Assistant Professor of Nursing* — Apartment 3, 810 Clarendon Street

J. Woodford Howard, Jr. (1962), Ph.D. (Princeton)
*Assistant Professor of Political Science* — 2617 Princeton Drive

William R. Hudson (1961), M.D. (Bowman Gray)
*Associate Professor of Otolaryngology* — 1102 Englewood Avenue

Sally Hughes-Schrader (1962), Ph.D. (Columbia)
*Visiting Professor of Zoology* — 2717 Dogwood Road

Alexander Hull (1962), Ph.D. (Washington)
*Assistant Professor of Romance Languages* — 928 Lambeth Drive

Wayland Elroy Hull (1953), Ph.D. (Duke)
*Associate Professor of Physiology* — 1624 Marion Avenue

Harold J. Humm (1954), Ph.D. (Duke)
*Associate Professor of Botany* — 2528 Wrightwood Avenue

Mrs. Wanda Sanborn Hunter (1947), Ph.D. (California)
*Associate Professor of Zoology* — 18 Alastair Court

Allan S. Hurlburt (1956), Ph.D. (Cornell)
*Professor of Education* — 112 Buchanan Boulevard

Anne Hurst (1963), Ph.D. (Reading)
*Instructor in Zoology* — #10 Vesson Apartments, 2404 Vesson Avenue

Mary M. Huse (1959), Ph.D. (Duke)
*Assistant Professor of Medical Psychology* — Ephesus Chapel Road

O. Kelly Ingram (1959), B.D. (Duke)
*Associate Professor of Applied Theology* — 2728 Sevier Street

Ann Madeline Jacobansky (1953), M.Ed. (Pittsburgh)
*Professor of Nursing* — 102 Faculty Apartments

Agnes Jane Janoscrat (1963)
*Instructor in Nursing* — 15 Campus Apartments

Marianna Duncan Jenkins (1948), Ph.D. (Bryn Mawr)
*Associate Professor of Art* — 619 Morehead Avenue

Malcolm E. Jewell (1963), Ph.D. (Pennsylvania)
*Visiting Associate Professor of Political Science* — 1106 West Knox

Bronislas de Leval Jezierski (1958), Ph.D. (Harvard)
*Associate Professor of Russian Language and Literature* — 3800 Hillgrand Dr.

Frederick Charles Joerg (1947), M.B.A. (Harvard)
*Professor of Economics* — 2424 Wrightwood

Betty Sue Johnson (1955), M.S.N.E. (Maryland)
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Charles B. Johnson (1956), Ed.D. (Duke)
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Edward Anthony Johnson (1963), B.S. (Sheffield)
*Associate Professor of Pharmacology* — 1408 Shepherd Street

Harry W. Johnson (1962), M.D. (Duke)
*Assistant Professor of Obstetrics and Gynecology* — 2832 Stuart Drive

Terry Walter Johnson, Jr. (1954), Ph.D. (Michigan)
*Associate Professor of Botany* — 2408 Prince Street

John Devereaux Johnston (1962), LL.B. (Duke)
*Assistant Professor in the School of Law* — 2810 Chelsea Circle

William Webb Johnston (1963), M.D. (Duke)
*Associate in Pathology* — 1025 Monmouth Avenue

Barney L. Jones (1956), B.D., Ph.D. (Duke)
*Associate Professor of Religion* — 2622 Pickett Road

Buford Jones (1962), Ph.D. (Harvard)
*Instructor in English* — 1108 Minerva Avenue

Edward Ellsworth Jones (1953), Ph.D. (Harvard)
*Professor of Psychology* — 2738 Sevier Street

James David Jones (1963), M.D. (Duke)
*Assistant Professor of Psychiatry and Associate in Pediatrics* — 1300 Oakland Avenue

Leon Lloyd Jones (1963), Ph.D. (Utah)
*Assistant Professor of Chemistry* — 1200 Leon Street; Apt. H-3

Leonidas John Jones (1961), M.S.E.E. (Duke)
*Instructor in Electrical Engineering* — 1310-F Leon Street

Oliver William Jones, Jr. (1963), M.D. (Oklahoma)
*Associate in Medicine* — 1560 Cal. Avenue, Palo Alto, California

Ronald L. Jones (1963), B.A. (Vanderbilt) Lt. (jg) U.S.N.
*Instructor in Naval Science* — 1931 Morehead Avenue

Thomas T. Jones (1958), M.D. (Johns Hopkins)
*Associate in Medicine* — 2621 Stuart Street

Archibald Currie Jordan (1925), M.A. (Columbia)
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Helen Louise Kaiser (1943), R.P.T. (Harvard)
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William Arthur Kale (1952), B.D. (Duke)
*Professor of Christian Education* — 500 East Markham Avenue

Henry Kamin (1948), Ph.D. (Duke)
*Associate Professor of Biochemistry* — 2417 Perkins Road

Nathan Kaufman (1960), M.D. (McGill)
*Professor of Pathology* — 2332 Sevier Street

Robert Norman Kearney (1963), Ph.D. (California)
*Assistant Professor of Political Science* — 415 Carolina Circle

Charles Rush Keith (1963), M.D. (Kansas)
*Assistant Professor of Psychiatry* — Route 1, Chapel Hill, N. C.

John Alexander Kelingos (1963), Ph.D. (Michigan)
*Assistant Professor of Mathematics* — 2114 Sprunt Street

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*Associate Professor of Economics* — 1024 West Markham Ave.

Walter Kempner (1934), M.D. (Heidelberg)
*Professor of Medicine* — 1505 Virginia Avenue

Van Leslie Kenyon, Jr. (1945), M.M.E. (Virginia) — Route 2
*Professor of Mechanical Engineering* — Hillsboro, N. C.

Grace Pardridge Kerby (1947), M.D. (Duke)
*Professor of Medicine* — 1108 Wells Street

Alan C. Kerckhoff (1958), Ph.D. (Wisconsin)
*Associate Professor of Sociology* — 1511 Pinecrest Road

Kaye H. Kilburn (1962), M.D. (Utah)
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Seuk Ky Kim (1963), M.D. (Severance)
*Associate in Radiology* — E-2 1200 Leon Street

Gregory Adams Kimble (1952), Ph.D. (Iowa State)
*Professor of Psychology* — 2513 Wrightwood Avenue

Charles Herschel King (1964), M.D. (Maryland)
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Thomas DeArman Kinney (1960), M.D. (Duke)
*Professor of Pathology* — 3120 Devon Road

Norman Kirschner (1956), Ph.D. (Pennsylvania State)
*Assistant Professor of Biochemistry* — 2420 Perkins Road

Joseph Weston Kitchen, Jr. (1962), Ph.D. (Harvard)
*Assistant Professor of Mathematics* — 2602 Francis Street

Janis V. Klavins (1960), M.D., Ph.D. (Kiel)
*Professor of Pathology* — Route 1; Durham, N. C.

Robert Frederick Klein (1963), M.D. (Alabama)
*Associate in Medicine* — 2119 Englewood Avenue

William Klenz (1947), Ph.D. (North Carolina) — 16 Rogerson Drive
*Associate Professor of Music* — Chapel Hill, N. C.

Peter H. Klopfer (1958), Ph.D. (Yale)
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Conrad Merton Knight (1961), B.S. (Norwich)
*Associate in Preventive Medicine* — 4603 Blanchard Road

Douglas Maitland Knight (1963), Ph.D. (Yale)
*Professor of English* — 2138 Campus Drive

Kenneth Richard Knoerr (1961), Ph.D. (Yale)
*Assistant Professor of Forestry* — 4429 Ryan Road

Sigmund Koch (1942-47; 1948), Ph.D. (Duke)
*Professor of Psychology* — Route 2, Durham, N. C.

Wellington W. Koepsel (1963), Ph.D. (Oklahoma State)
*Associate Professor of Electrical Engineering* — 2502 Wilbon Street

Jack L. Kostyo (1959), Ph.D. (Cornell)
*Associate Professor of Physiology* — 604 Starmont Drive

John C. Kouns (1957), D.D.S. (Emory) — Sourwood Drive
*Associate in Dentistry* — Chapel Hill, N. C.

Paul Jackson Kramer (1931), Ph.D. (Ohio State)
*James B. Duke Professor of Botany* — 2251 Cranford Road

Edward Kready Kraybill (1939), M.S.E. (Michigan)
*Associate Professor of Electrical Engineering* — 2726 Circle Drive

Irwin Kremen (1963), Ph.D. (Harvard)
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Mrs. Juanita Kreps (1955), Ph.D. (Duke) — Morgan Creek Road
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William R. Krigbaum (1952), Ph.D. (Illinois)
*Professor of Chemistry* — 2015 Woodland Drive

Robert Krueger (1961), B. Litt. (Oxon.)
*Instructor in English* — Box 6455, College Station

W. W. Kulski (1963), LL.D. (Paris)
*Visiting James B. Duke Professor of Russian Affairs* — 6 Sylvan Road

Sudhir Kumar (1959), Ph.D. (Pennsylvania)
*Visiting Associate Professor of Civil Engineering* — 2014 Sprunt Street

Stanley M. Kurtz (1961), M.D., Ph.D. (George Washington)
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Mrs. Maurine Boie LaBarre (1961), M.S.W. (Bryn Mawr)
*Assistant Professor of Psychiatric Social Work* — Mt. Sinai Road, Rt. #1

Weston LaBarre (1946), Ph.D. (Yale)
*Professor of Anthropology* — Mt. Sinai Road, Rt. #1

Creighton Lacy (1953), B.D., Ph.D. (Yale)
*Associate Professor of World Christianity* — 2714 Dogwood Road

Martin Lakin (1958), Ph.D. (Chicago)
*Associate Professor of Medical Psychology in Department of Psychiatry and Assistant Professor of Psychology* — 1840 Forest Road

Richard A. Lamanna (1963), M.A. (Fordham)
*Instructor in Sociology* — 7-B Bolen Heights, Chapel Hill, N. C.

Charles Earl Landon (1926), Ph.D. (Illinois)
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Thomas A. Langford (1956), B.D., Ph.D. (Duke)
*Assistant Professor of Religion* — 2002 Dartmouth Street

John Tate Lanning (1927), Ph.D. (California)
*James B. Duke Professor of History* — 3007 Surrey Road

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Arthur Larson (1958), D.C.L. (Oxon.)
*Professor of Law* — 3408 Dover Road

John Laszlo (1960), M.D. (Harvard)
*Assistant Professor of Medicine* — Cornwallis Road

Elvin Remus Latty (1937), J.Sc.D. (Columbia)
*Professor of Law* — 3620 Hathaway Road

Richard H. Leach (1955), Ph.D. (Princeton)
*Associate Professor of Political Science* — 1313 Woodburn Road

Harold E. Lebovitz (1962), M.D. (Pittsburgh)
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John C. LeMay (1961), D.V.M. (Georgia)
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Rosemary Minor Lemmond (1963), M.S. (Duke)
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Warren Lerner (1961), Ph.D. (Columbia)
*Assistant Professor of History* — 2104 Dartmouth Street

Maurice Lesage (1959), M.D. (Paris)
*Assistant Professor of Experimental Surgery* — Route #2, Chapel Hill, N. C.

Richard Leshin (1963)
*Visiting Artist* — F-6 1200 Leon Street

Joseph R. LeTourneau (1962), B.A. (California), Commander, U.S.N.
*Associate Professor of Naval Science* — 1505 Acadia Street

Harold Walter Lewis (1946), Ph.D. (Duke)
*Professor of Physics* — 2307 Sprunt Street

Martha Modena Lewis (1933), M.A. (Columbia)
*Professor of Physical Education* — 407 Erwin Apartments

Ralph Elton Lewis (1941), M.S. in M.E. (Illinois)
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John L. Lievsay (1962), Ph.D. (Washington)
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Charles Harris Livengood, Jr. (1946), LL.B. (Harvard)
*Professor of Law* — 2804 Chelsea Circle

Daniel A. Livingston (1956), Ph.D. (Yale)
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Charles E. Llewellyn, Jr. (1955), M.D. (Medical College of Virginia)
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Jane Marie Lloyd (1961), M.A. (North Carolina)
*Assistant Professor of Physical Education* — 706 Louise Circle

Arthur Hill London, Jr. (1932), M.D. (Pennsylvania)
*Assistant Professor of Pediatrics* — 808 Wells Street

Ernest Croft Long (1956), Ph.D. (London)
*Associate Professor of Physiology and Pharmacology and Associate in Pediatrics* — Box 204B, Route #1, Erwin Road

Hans Löwenbach (1940), M.D. (Hamburg)
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Charles Lucien Baker Lowndes (1934), S.J.D. (Harvard)
*James B. Duke Professor of Law* — 2016 Club Boulevard

Robert M. Lumiansky (1963), Ph.D. (North Carolina)
*Professor of English* — 2738 Sevier Street

William S. Lynn, Jr. (1954), M.D. (Columbia)
*Associate Professor of Medicine and Associate Professor of Biochemistry* — 4014 Bristol Road

Angus M. McBryde (1931), M.D. (Pennsylvania)
*Professor of Pediatrics* — 3406 Westover Road

Kenneth Scott McCarty (1959), Ph.D. (Columbia)
*Associate Professor of Biochemistry* — 2713 Dogwood Road

Wallace McClure (1958), Ph.D. (Columbia)
*Lecturer in Law* — Box 7311 College Station

Mrs. Ella McColl (1958), M.S. (Maryland)
*Assistant Professor of Nursing* — 101 West Club Boulevard

Thomas E. McCollough (1961), Th.D. (Southern Baptist Theological Seminary, Louisville, Kentucky)
*Assistant Professor of Religion* — 2227 Cranford Road

Donald E. McCollum (1962), M.D. (Bowman Gray)
*Assistant Professor of Orthopedic Surgery* — 1012 N. Duke Street

Alice L. McCrea (1961), M.S. (Chicago)
*Assistant Professor of Radiation Therapy* — 1012 Shepherd Street

Frederick D. McFalls (1962), M.D. (Duke)
*Assistant Professor of Anatomy* — 911 Morehead Avenue

John S. McGee (1962), Ph.D. (Vanderbilt)
*Professor of Economics* — 1103 Sourwood Circle, Chapel Hill, N. C.

William E. McGough (1963), M.D. (Duke)
*Assistant Professor of Psychiatry* — Route 3, Hillsboro, N. C.

Gelolo McHugh (1946), Ph.D. (Columbia)
*Associate Professor of Psychology* — 1010 Monmouth Avenue

Henry Deane McIntosh (1955), M.D. (Pennsylvania)
*Professor of Medicine* — 2705 Stuart Drive

James Thomas McKeel, Jr. (1956), M.S. (North Carolina State)
*Assistant Professor of Electrical Engineering* — 2622 Charlotte Street

John C. McKinney (1957), Ph.D. (Michigan)
*Professor of Sociology and Professor of Medical Sociology in Department of Psychiatry* — 1627 Marion Avenue

Mary Helen McLachlan (1958), M.A. (Missouri)
*Associate Professor of Dietetics* — 2022 Bivins Street

Thomas Joseph McManus (1961), M.D. (Boston)
*Assistant Professor of Physiology and Pharmacology* — 1408 Oakland Ave.

Harry Thurman McPherson (1955), M.D. (Duke)
*Associate Professor of Medicine* — 3200 Oxford Drive

Samuel D. McPherson, Jr. (1949), M.D. (Johns Hopkins)
*Associate in Ophthalmology* — 29 Oak Drive

John Nelson Macduff (1956), M.M.E. (New York)
*Professor of Mechanical Engineering* — 2733 Dogwood Road

George L. Maddox (1960), Ph.D. (Michigan State)
*Associate Professor of Medical Sociology in Department of Psychiatry* — 1005 North Duke Street

Alan Krebs Manchester (1929), Ph.D. (Duke)
*Professor of History* — 406 Swift Avenue

Joseph Eldridge Markee (1943), Ph.D. (Chicago)
*James B. Duke Professor of Anatomy* — 1015 Demerius Street

Sidney David Markman (1947), Ph.D. (Columbia)
*Associate Professor of Art History and Archaeology* — 919 Urban Avenue

George Eric Marler (1963), M.D.C.M. (McGill)
*Associate in Medicine and Associate in Biochemistry* — 2006 Dartmouth Drive

David V. Martin (1962), Ed.D. (Duke)
*Assistant Professor of Education* — 2312 Wilson Street

Capitola Mattingly (1962), M.S.N. (Catholic University of America)
*Associate Professor of Nursing* — 904 Demerius Street

William Cary Maxwell (1930), Ph.D. (Heidelberg)
*Associate Professor of German* — 142 Pinecrest Road

Otto Meier, Jr. (1934), Ph.D. (Pennsylvania)
*Professor of Electrical Engineering* — 113 Pinecrest Road

Elijah Eugene Menefee, Jr. (1940), M.D. (Duke)
*Professor of Medicine* — 2205 Cranford Road

Charles E. Mengel (1962), M.D. (Johns Hopkins)
*Associate in Medicine* — 126 Pinecrest Road

Robert J. Menzies (1962), Ph.D. (California)
*Professor of Zoology* — Mitchell Village, Beaufort, North Carolina

James L. Meriam (1963), Ph.D. (Yale)
*Professor of Engineering Mechanics* — 3434 Rugby Road

Richard S. Metzgar (1962), Ph.D. (Buffalo)
*Assistant Professor of Immunology* — 3613 Westover Road

Horst Meyer (1959), Docteur ès Sciences (Geneva)
*Associate Professor of Physics* — 1411 Anderson Street

M. Victor Michalak (1950), Ph.D. (Indiana)
*Assistant Professor of English* — 804 Louise Circle

Gustavus H. Miller (1955), Ph.D. (Michigan)
*Assistant Professor of Romance Languages* — Bartram Drive, Chapel Hill, N. C.

Carol L. Mitcham (1956), Ph.D. (North Carolina)
*Instructor in Nursing* — 25 Rogerson Drive, Chapel Hill, N. C.

Forest Mixon (1963), Ph.D. (Delaware)
*Visiting Lecturer in Mechanical Engineering* — Shadylawn Road, Chapel Hill, N. C.

Ichiro Miyagawa (1963), D.Sc. (Tokyo)
*Visiting Assistant Professor of Physics* — 1806 Lakewood Avenue

John W. Moore (1961), Ph.D. (Virginia)
*Associate Professor of Physiology* — Kenmore Road, Chapel Hill, N. C.

William Hamilton Moore (1963), Ph.D. (Harvard)
*Instructor in English* — 9 Campus Apartments, Elf Street

Mary Jane Morgan (1961), M.Ed., M.S.N. (Yale)
*Assistant Professor of Nursing* — 2220 Elba Street

John Andrew Morgan (1962), M.A. (Duke)
*Instructor in Political Science* — 405 Watts Street

James Joseph Morris (1963), M.D. (New York State)
*Associate in Medicine* — 3711 Tremont Drive

Montrose J. Moses (1959), Ph.D. (Columbia)
*Associate Professor of Anatomy* — 152 Pinecrest Road

Earl George Mueller (1945), Ph.D. (Iowa)
*Associate Professor of Art* — 1001 Gloria Avenue

Mrs. Julia Wilkinson Mueller (1939-41; 1946), M.A. (Iowa)
*Associate Professor of Music* — 1001 Gloria Avenue

Robert H. Mundheim (1964), LL.B. (Harvard)
*Visiting Professor of Law* — 3311-A Mordecai Street

Donald Munson (1962), M.D. (Wisconsin)
*Adjunct Assistant Professor of Radiology* — 2615 Stuart Drive

Francis J. Murray (1960), Ph.D. (Columbia)
*Professor of Mathematics* — 1011 Homer Street

A. Wendell Musser (1963), M.D. (Duke)
*Assistant Professor of Pathology* — Apt 11-E Town House Apts., Chapel Hill, N. C.

Thomas H. Nash, Jr. (1959), B.S.M.E. (Iowa State)
*Assistant Professor of Mechanical Engineering* — 916 Monmouth Avenue

Blaine S. Nashold, Jr. (1957), M.D. (McGill)
*Assistant Professor of Surgery in Division of Neurosurgery* — 410 E. Forest Hills Boulevard

Dorothy E. Naumann (1963), M.D. (Syracuse)
*Associate in Preventive Medicine* — 210 Faculty Apartments

Aubrey Willard Naylor (1952), Ph.D. (Chicago)
*Professor of Botany* — 881 Louise Circle

Thomas Herbert Naylor (1964), Ph.D. (Tulane)
*Assistant Professor of Economics* — B1-1200 Leon Street

Glenn Robert Negley (1946), Ph.D. (Chicago)
*Professor of Philosophy* — 3610 Hathaway Road

Ernest William Nelson (1926), Ph.D. (Cornell)
*Professor of History* — 939 Lambeth Circle

M. William Nesbitt, Jr. (1957), B.D. (Duke)
*Assistant Professor of the Work of the Rural Church* — 1609 Peace Street

Barbara Carol Newborg (1952), M.D. (Johns Hopkins)
*Associate in Medicine* — 1503 Virginia Avenue

Henry Winston Newson (1948), Ph.D. (Chicago)
*Professor of Physics* — 1111 North Gregson Street

Claude R. Nichols, Jr. (1958), M.D. (Baylor)
*Assistant Professor of Psychiatry* — 1114 Woodburn Road

William McNeal Nicholson (1935), M.D. (Johns Hopkins)
*Professor of Medicine* — 824 Anderson Street

Walter McKinley Nielsen (1925), Ph.D. (Minnesota)
*James B. Duke Professor of Physics* — 139 Pinecrest Road

William C. North (1959), M.D., Ph.D. (Northwestern)
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Holgar Olof Nygard (1960), Ph.D. (California)
*Professor of English* — Route 2, Cole Mill Road

Walter D. Obrist (1957), Ph.D. (Northwestern)
*Professor of Medical Psychology in Department of Psychiatry and Assistant Professor of Psychology* — 2604 McDowell Street

Guy Leary Odom (1943), M.D. (Tulane)
*Professor of Neurosurgery* — 2812 Chelsea Circle

Richard T. Oldham (1962), M.A. (Washington), Major, U.S.A.F.
*Associate Professor of Air Science* — 2020 Hillandale Road

Billy Brown Olive (1960), B.S.E.E., LL.B. (St. Johns)
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Henry J. Oosting (1932), Ph.D. (Minnesota)
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Edward Stewart Orgain (1934), M.D. (Virginia)
*Professor of Medicine* — 3321 Devon Road

Robert Tappan Osborn (1954), B.D., Ph.D. (Drew)
*Associate Professor of Religion* — 2732 McDowell Street

James G. Osborne (1961), B.S. (California)
*Professor of Forest Biometry* — 2756 McDowell Street

Suydan Osterhout (1959), M.D., Ph.D. (Rockefeller Institute)
*Associate in Medicine and Assistant Professor of Microbiology* — 802 Starmont Drive

David G. Ostrolenk (1961), M.D. (Pennsylvania)
*Assistant Professor of Radiology* — 2316 Prince Street

Athos Ottolenghi (1959), M.D. (Tavia)
*Assistant Professor of Pharmacology* — 918 Green Street

John R. Overman (1950), M.D. (Duke)
*Professor of Bacteriology and Assistant Professor of Medicine* — 2539 Sevier Street

Edward V. Owen (1962), M.D. (Washington)
*Assistant Professor of Medicine* — 922 Green Street

Harry Ashton Owen, Jr. (1951), Ph.D. (North Carolina State)
*Associate Professor of Electrical Engineering* — 2741 McDowell Street

Aubrey Edwin Palmer (1944), C.E. (Virginia)
*Associate Professor of Civil Engineering* — 2525 Highland Avenue

Harold Talbot Parker (1939), Ph.D. (Chicago)
*Professor of History* — 923 Dacian Avenue

Roy T. Parker (1954), M.D. (Virginia)
*Professor of Obstetrics and Gynecology* — 111 Pinecrest Road

Suzanne Lowry Parks (1964), M.S.N. (Maryland)
*Assistant Professor of Nursing* — 1412 Banbury Road, Raleigh, N. C.

Joel Francis Paschal (1952), Ph.D. (Princeton)
*Professor of Law* — 1527 Pinecrest Road

Ransom Rathbone Patrick (1954), Ph.D. (Princeton)
*Professor of Art History* — 116 Pinecrest Road

John D. Patton (1959), M.D. (St. Louis)
*Associate in Psychiatry* — Highland Hospital, Asheville, N. C.

Lewis Patton (1926), Ph.D. (Yale)
*Professor of English* — 614 Swift Avenue

Hilda I. Pavlov (1960), M.A. (Leningrad)
*Assistant Professor of Russian* 709 Reta Road

Michael I. Pavlov (1960), M.A. (Leningrad)
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William Bernard Peach (1951), Ph.D. (Harvard)
*Professor of Philosophy* 920 Dacian Avenue

Talmadge Lee Peele (1939), M.D. (Duke)
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Charles Henry Peete, Jr. (1953), M.D. (Harvard)
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William P. J. Peete (1955), M.D. (Harvard)
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Joseph Pepper (1962), Artist's Diploma (Curtis Institute)
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Harold Sanford Perry (1932), Ph.D. (Cornell)
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Elbert Lapsley Persons (1930), M.D. (Harvard)
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Walter Scott Persons (1930), A.B. (Duke)
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Ernst Peschel (1953), M.D. (Berlin)
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Anton Peterlin (1961), Ph.D. (Berlin)
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Robert Francis Pethia (1961), M.B.A. (Ohio State)
*Instructor in Economics* Apartment 3, 2302 Pratt Street

Ray C. Petry (1937), Ph.D. (Chicago)
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Olan Lee Petty (1952), Ph.D. (Iowa)
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John Bernard Pfeiffer, Jr., (1949), M.D. (Cornell)
*Associate Professor of Medicine* 3414 Rugby Road

Leland R. Phelps (1961), Ph.D. (Ohio State)
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James Henry Phillips (1946), Ph.D. (Yale)
*Associate Professor of Religion* 2517 Perkins Road

Jane Philpott (1951), Ph.D. (Iowa State)
*Associate Professor of Botany* 2260 Cranford Road

Henry Floyd Pickett (1935), A.B.
*Associate in Medical Art and Illustration and Photographer* 1212 W. Cornwallis Road

Kenneth LeRoy Pickrell (1944), M.D. (Johns Hopkins)
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Theo Clyde Pilkington (1961), Ph.D. (Duke)
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Felix J. Pircher (1962), M.D. (Innsbruck)
*Assistant Professor of Radiology* 1200 Leon Street

Erwein Pitterman (1962), Ph.D. (Marinburg)
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Sarah S. Polt (1962), M.D. (Medical College of Pennsylvania)
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*Assistant Professor of Nursing* — 2109 Chapel Hill Road

Thomas G. Wilson (1959), Sc.D. (Harvard)
*Professor of Electrical Engineering* — 2721 Sevier Street

William P. Wilson (1961), M.D. (Duke)
*Professor of Psychiatry* — 1209 Virginia Avenue

Janet Winecoff (1962), Ph.D. (Duke)
*Instructor in Romance Languages* — Route #2, University Heights, Chapel Hill, N. C.

Manfred Winnewisser (1963), Ph.D. (Karlsruhe)
*Instructor in Physics* — 319-½ East Trinity

Halliman H. Winsborough (1962), Ph.D. (Chicago)
*Assistant Professor of Sociology* — 2717 Augusta Drive

Orval S. Wintermute (1958), B.D., Ph.D. (Johns Hopkins)
*Assistant Professor of Religion and Lecturer in Old Testament* — 1103 North Duke Street

Loren Ralph Withers (1949), M.S. (Juilliard)
*Associate Professor of Music* — 2741 Dogwood Road

Benjamin Wittels (1961), M.D. (Minnesota)
*Assistant Professor of Pathology* — 2308 Prince Street

C. Hilburn Womble (1958), Ph.D. (Johns Hopkins)
*Assistant Professor of Latin* — 1309 Alabama Avenue

Donald J. Wood (1962), Ph.D. (Carnegie Institute of Technology)
*Assistant Professor of Civil Engineering* — Rt. 2, Chapel Hill, N. C.

Barnes Woodhall (1937-43; 1945), M.D. (Johns Hopkins)
*Professor of Neurosurgery* — 4006 Dover Road

Frank W. Woods (1958), Ph.D. (Tennessee)
*Assistant Professor of Silviculture* — 1509 Pinecrest Road

Robert Hilliard Woody (1929), Ph.D. (Duke)
*Professor of History* — 2734 Circle Drive

Alma Lorraine Woodyard (1954), M.Ed. (North Carolina, Greensboro)
*Assistant Professor of Physical Education* — 880 Louise Circle

Allan D. Wooley (1962), Ph.D. (Princeton)
*Instructor in Classical Studies* — 2732 Roxboro Road

Boyd T. Worde (1958), M.D. (Tennessee)
*Associate Professor of Radiology* — 2512 Sevier Street

Mrs. Julia Ann Hedgepeth Wray (1955), M.F.A. (North Carolina, Greensboro)
*Assistant Professor of Physical Education* — 911 Carver Street

James B. Wyngaarden (1956), M.D. (Michigan)
*Professor of Medicine and Associate Professor of Biochemistry* — 1106 West Knox Street

James O. Wynn (1959), M.D. (Cornell)
*Assistant Professor of Medicine* — 416 Carolina Circle

William P. Yohe (1958), Ph.D. (Michigan)
*Associate Professor of Economics* — 2021 Dartmouth Drive

James G. Yoho (1956), Ph.D. (Michigan State)
*Professor of Forest Economics* — 2522 Sevier Street

Charles R. Young (1954), Ph.D. (Cornell)
*Associate Professor of History* — 2929 Welcome Drive

Helen Rose Young (1957), M.S. (William and Mary)
*Assistant Professor of Nursing* — A3A University Apartments

Paul Young (1956), M.A. (Illinois)
*Professor in the Faculty of Arts and Sciences* — 1110 Shepherd Street

W. Glenn Young, Jr. (1954), M.D. (Duke)
*Professor of Surgery* — 1407 Dollar Avenue

Karl Edward Zener (1928), Ph.D. (Harvard)
*Professor of Psychology* — 2727 Sparger Road

Chester M. Zmijewski (1963), Ph.D. (Buffalo)
*Assistant Professor of Immunology* — 3614 Westover Road

## *Part-Time Instructors*

Jonathan Edwards Adams, Jr., B.S.
*Mathematics* — 259 Men's Graduate Center

Robert Brown Ambrose, B.S.
*Mathematics* — 204 Men's Graduate Center

James Lee Babin, B.A.
*Graduate Tutor in English* — 3311 Mordecai Street

Paul J. Baker, M.A.
*Sociology* — 2114 Elba Street

John W. Battle, A.B.
*Romance Languages* — Methodist Student Center

James R. Belflower, M.A.
*Graduate Tutor in English* — Box 4425, Duke Station

Paul Robert Bengel, B.S.
*Mechanical Engineering* — 3325-B Glasson Street

James Voigt Bewick, M.B.A.
*Mathematics* — 1506 Kent Street

Julia Gibson Biehn, M.A.
*Economics* — 1220-B Morrene Road

Thomas Earl Borcherding, M.A.
*Economics* — 3324-B Glasson Street

Louis Bowles Bresee, B.S.
*Mechanical Engineering* — 1305 East Leon Street

Anne-Marie Bryan, M.A.T.
*Romance Languages* — 2400 Tampa Avenue

Richard W. Burow, B.S.
*Mechanical Engineering* — 813 Green Street

Douglas Moore Cairns, B.S.
*Mathematics* — 1200 Leon Street H-8

George A. Cate, M.A.
*Graduate Tutor in English* — Box 5672, Duke Station

A. Ralph Cavaliere, M.S.
*Botany* — 1208 Arnette Avenue

Fred Davis Chappell, A.B.
*Graduate Tutor in English* — 805 Onslow Street

Chang Chen, B.S.
*Civil Engineering* — 2215 Elder Street

Eddie Gay Cone, M.A.
*Graduate Tutor in English* — 1104 Men's Graduate Center

Larry Wayne Cook, M.A.
*Graduate Tutor in English* — Box 5855, Duke Station

Ronald Crossley, B.D.
*Religion* — Route 1, Hillsboro, N. C.

Mrs. Barbara Cushman, B.M.
*Music* — 2022 Campus Drive

| | |
|---|---|
| Frank Mark Davis, M.A.<br>*Graduate Tutor in English* | 1500 Woodland Drive |
| James K. Day, A.B.<br>*German* | 215 Vance Street<br>Chapel Hill, N. C. |
| John J. Dunn, M.A.<br>*Graduate Tutor in English* | 3311-A Glasson Street |
| Frank E. Eakin, B.D.<br>*Religion* | 704 West Club Boulevard |
| Richard R. Entwhistle, M.S.<br>*Mathematics* | 3419-E Glasson Street |
| Lewis Turner Farmer, B.S.<br>*Mathematics* | 1501 Carolina Street |
| John Alden Farrell, B.A.<br>*Physics* | 2213 Elder #9 |
| Richard F. Glenn, B.A.<br>*Romance Languages* | 1197 Men's Graduate Center |
| William O. Goode, M.A.<br>*Romance Languages* | 1187 Men's Graduate Center |
| Thomas Frederick Gordon<br>*Mathematics* | 2715 Augusta Drive |
| Elizabeth W. Grant, M.A.<br>*Romance Languages* | 2509 Wrightwood |
| Roy Neil Graves, II, M.A.<br>*Graduate Tutor in English* | Route 3<br>3838 Lyckan Park Way |
| David G. Hale, M.A.<br>*Graduate Tutor in English* | 309 West Geer Street |
| James Edward Hall, B.S.E.E.<br>*Electrical Engineering* | 1221 Men's Graduate Center |
| Mary Griffin Halloran, M.A.<br>*Graduate Tutor in English* | 701 Louise Circle |
| William Edward Hammond, B.S.E.E.<br>*Electrical Engineering* | 10 Forrestdale Drive |
| Wayne Earle Haskin, M.A.<br>*Graduate Tutor in English* | 1706 Lake Street |
| Robert A. Hohner, M.A.<br>*History* | 838 Louise Circle |
| Anne Thistlewaite Hull, M.A.<br>*Romance Languages* | 928 Lambeth Circle |
| Joseph Marvin Hunt, III, M.S.E.E.<br>*Electrical Engineering* | Apartment B-2<br>1403 Duke University Road |
| David Teh-yu Kao, B.S.<br>*Civil Engineering* | 2215 Elder Street |
| Richard M. Kelly, M.A.<br>*Graduate Tutor in English* | 305 West Maynard Avenue |
| William Daniel Kelly, B. S.<br>*Mathematics* | 1200 Leon Street, D-S |
| William T. Kendrick, B.A.<br>*Mechanical Engineering* | Men's Graduate Center |
| James M. Kuist, M.A.<br>*Graduate Tutor in English* | 503 Compton Place |
| Granvil C. Kyker, Sc.B.<br>*Physics* | 807 Demerius St. J-4 |
| John T. LaVia, M.A.<br>*Graduate Tutor in English* | 3324-A Glasson Street |

| | |
|---|---|
| Jean Pierre Le Floch, Ind. Dipl.<br>*Electrical Engineering* | 3406-H Mordecai Street |
| Norman Locksley, M.A.<br>*Mathematics* | 611 West Markham Avenue |
| Johan A. Lovink, M.A.<br>*Political Science* | 3440-C Glasson Street |
| Charles T. Ludington, Jr., B.A.<br>*Graduate Tutor in English* | 3012 Mossdale Street |
| Ernest Asbury Lumsden, Jr., B.A.<br>*Psychology* | 708 Parker Street |
| Mrs. Adeline McCall, M.A.<br>*Music* | P. O. Box 843<br>Chapel Hill, N. C. |
| John Harman McElroy, M.A.<br>*Graduate Tutor in English* | 2111 Knox Street |
| Edwin W. Marrs, Jr., M.A.<br>*Graduate Tutor in English* | 8-A Towne House Apts.<br>Chapel Hill, N. C. |
| David Mascitelli, M.A.<br>*Graduate Tutor in English* | Route 1, Garrett Road |
| Violet Mae Meade, M.A.<br>*Physical Education* | 515 Hillsboro Road<br>Chapel Hill, N. C. |
| Jon M. Moline, A.B.<br>*Philosophy* | 1301 Clarendon Street |
| Charles A. Moore, Jr., B.S.<br>*Civil Engineering* | Route 3, Box 310 |
| Evelyn Murphy, M.A.<br>*Economics* | 1804 Shelton Avenue |
| J. Allen Norris, M.A.T.<br>*Education* | 1803 Morehead Ave. |
| Erskine Dixon Owens, A.B.<br>*Physical Education* | 2207-A Elder Street |
| Norman L. Owsley, B.S.E.E.<br>*Electrical Engineering* | 2023 Wilson Street |
| Barbara Maud Pepper<br>*Music* | 1205 Washington Street |
| Denny E. Pilant, M.A.<br>*Political Science* | 903 Lambeth Circle |
| Don C. Piper, Ph.D.<br>*Political Science* | 2511 Banner Street |
| Charles T. Pridgeon, M.A.<br>*Graduate Tutor in English* | 3311-B Glasson Street |
| Suzanne Townsend Purrington, Ph.D.<br>*Chemistry* | 2401 Country Club Court<br>Raleigh, North Carolina |
| Jai Raj Narain Rajan, B.S.C.E.<br>*Civil Engineering* | 2131 Guess Road |
| Lamar Cecil Ratcliffe, B.S.<br>*Mathematics* | 1804 Bivins Street |
| David Charles Roller, M.A.<br>*History* | 9216, Duke Station |
| Gilbert Rutman, M.A.<br>*Economics* | 813 Buchanan Boulevard |
| Surendra Kumar Saxena, B.S.E.E.<br>*Civil Engineering* | 2406 Pratt Street |
| Russell P. Sparling, M.A.<br>*Graduate Tutor in English* | 1309 Washington Street |

| | |
|---|---|
| W. K. Stars, M.A.<br>*Art* | 1916 Glendale Avenue |
| Glen Stassen, B.D.<br>*Religion* | 3325-C Glasson Street |
| Max Keith Sutton, M.A.<br>*Graduate Tutor in English* | 3306 Hope Valley Road |
| Robert M. Terry, B.A.<br>*Romance Languages* | 1169 Men's Graduate Center |
| George Joseph Titus, B.M.E.<br>*Mechanical Engineering* | 134 Men's Graduate Center |
| Adolph Edward Tokaz, B.S.<br>*Mathematics* | 1106 Burch Avenue |
| Robert Amrine Turner, B.S.<br>*Mathematics* | 308 Men's Graduate Center |
| Ralph M. Tutt, Jr., M.A.<br>*Graduate Tutor in English* | 208 Buchanan Boulevard |
| Norma Upchurch, M.A.<br>*Romance Languages* | 107-C Epworth Inn |
| Thomas A. Van, M.A.<br>*Graduate Tutor in English* | 3325 Glasson Street |
| David E. Whisnaut, M.A.<br>*Graduate Tutor in English* | 1304 Lakewood Avenue |
| Frederick George Wild, B.S.<br>*Mathematics* | D-3 1200 Leon Avenue |
| Edward Joseph Wiltrakis, B. S.<br>*Mathematics* | 2117 Englewood Avenue |
| Yuan Yu, B.S.<br>*Electrical Engineering* | 3308-F Glasson Street |
| Joseph Zikmund, II, M.S.<br>*Political Science* | 918 Monmouth Street |

## *Research Associates*

| | |
|---|---|
| Seymour Axelrod, Ph.D.<br>*Psychiatry* | 805 West Club Boulevard |
| Robert W. Blount, Ph.D.<br>*Physiology* | Johnston House<br>Route 3, Hillsboro, N. C. |
| Yozo Chatani, Ph.D.<br>*Chemistry* | 1301 Alabama Avenue |
| Robert Lee Cook, Ph.D.<br>*Physics* | Westover Park Apartments |
| Chicita F. Culberson, Ph.D.<br>*Botany* | Route 1, King Road |
| Eubert Jonathan Daniel, Ph.D.<br>*Pathology* | 1620 Alcott Street |
| Terence John Dawson, Ph.D.<br>*Zoology* | 2213 Elder Street |
| Robert E. Doolittle, Ph.D.<br>*Chemistry* | 815 Louise Circle |
| Lloyd Ray Fortney, Ph.D.<br>*Physics* | 1200 Leon Street |
| John Albert Freeman, Ed.D.<br>*Parapsychology* | 1614 University Drive |

| | |
|---|---|
| Peter Fritz, Ph.D.<br>*Chemistry* | 1024 West Markham Avenue |
| Ruth Georgiade, M.S.<br>*Surgery* | 2523 Wrightwood Avenue |
| Joy Rochelle Gold, M.A.<br>*Sociology* | 54 Maxwell Road<br>Chapel Hill, N. C. |
| Kazimierz Gryzybowski, S.J.D.<br>*World Rule of Law Center* | 62 Rosenstatt<br>Leyden, Netherlands |
| John William Halderman, LL.B.<br>*World Rule of Law Center* | 2216 Elmwood Avenue |
| Arthur Brooks Harris, Ph.D.<br>*Physics* | 2208 Chapel Hill Road |
| Ursula Heine, Ph.D.<br>*Surgery* | D-7 1200 Leon Street |
| Clinton Edward Hollandsworth, Jr., Ph.D.<br>*Physics* | 3810 Chapel Hill Road |
| Takeshi Hoshi, Ph.D.<br>*Zoology* | 200 #7 Atlas Street |
| Earl Raymond Hunt, Ph.D.<br>*Physics* | 1030 West Trinity Avenue |
| Donald Cargill Jackson, Ph.D.<br>*Zoology* | 2415 West Club Boulevard |
| Frances Carolina Jeffers, M.A.<br>*Psychiatry* | Route 1, Ephesus Church Road |
| William Jurgelsky, Jr., Ph.D.<br>*Pathology* | 1510 Echo Road |
| Varda F. Kahn, Ph.D.<br>*Physiology* | 1127 Delano Street |
| William G. Kenyon, Ph.D.<br>*Chemistry* | 1500 Duke University Road |
| James Milton Knight, Ph.D.<br>*Physics* | C-3 Westover Park Apartments |
| Nathan Kogan, Ph.D.<br>*Psychology* | 46 Lindon Lane<br>Princeton, New Jersey |
| Jan J. Kohlmeyer, Ph.D.<br>*Botany* | Duke Marine Laboratory<br>Beaufort, N. C. |
| Hedwig Kohn, Ph.D.<br>*Physics* | 515 South Duke Street |
| Peregrina Labay, M.D.<br>*Surgery* | 922 Lambeth Circle |
| Christoph Landschuetz, Ph.D.<br>*Surgery* | 808 Park Avenue |
| Luke Tsung-Chou Lee, Ph.D.<br>*World Rule of Law Center* | D-1-D University Apartments |
| Michael Stephen Patrick Lucas, M.S.<br>*Electrical Engineering* | Box 40, Route 2 |
| Shigeo Maruno, Ph.D.<br>*Chemistry* | 1117 Clarendon Street |
| Marion L. Miles, Ph.D.<br>*Chemistry* | 2417 Cascadilla Street |
| Ronald E. Montgomery, Ph.D.<br>*Chemistry* | 911 Burch Street |
| Edward Towson Moore, Ph.D.<br>*Electrical Engineering* | 113 Faculty Apartments |

| | |
|---|---|
| Keio Nagami, D.Sc.<br>*Mathematics* | 1215 Clarendon Street |
| Shinzo Nakai, Ph.D.<br>*Physics* | 1200 Leon Street |
| Mahomed Khader Nawaz, M.L.<br>*World Rule of Law Center* | 2304 Elba Street |
| Virginia Johnston Neelon, M.S.<br>*Medicine* | Route 6; Box 225 |
| Kurt Niedenzu, Ph.D.<br>*Chemistry* | 1324 Arnette Avenue |
| Winnifred Moon Nielsen, Ph.D.<br>*Parapsychology* | 318 N. Churton Street<br>Hillsboro, N. C. |
| Yasuhiko Nozaki, Ph.D.<br>*Biochemistry* | 2720 Erwin Road |
| Paul Blair Parks, III<br>*Physics* | 1102 Virginia Avenue |
| Daniel Gordon Partan, LL.M.<br>*World Rule of Law Center* | 944 Lambeth Circle |
| John T. Pearson, Ph.D.<br>*Chemistry* | 907 #2 Lancaster Road |
| Suzanne T. Purrington, Ph.D.<br>*Chemistry* | 2401 Country Club Road<br>Raleigh, N. C. |
| Peter M. Quan, Ph.D.<br>*Chemistry* | 602 South Duke Street |
| Walter L. Randall, Ph.D.<br>*Psychology* | 1609 Cole Mill Road |
| Koneru Ramakrishna Rao, Ph.D.<br>*Parapsychology* | 2415 Huron Street |
| P. Ramchender Rao, Ph.D.<br>*Surgery* | 1515 Arcadia Street |
| David Cooke Rorer, Ph.D.<br>*Physics* | 3703 Britt Street |
| Theodore Rosett, Ph.D.<br>*Biochemistry* | 1713 James Street |
| Takashi Shinoda, M.D.<br>*Surgery* | 251 Men's Graduate Center |
| Ralph O. Slatyer, D.Sc.<br>*Botany* | CSIRO, Division of Land Research<br>Canberra ACT, Australia |
| Donald W. Slocum, Ph.D.<br>*Chemistry* | 301 Swift Avenue |
| C. Frank Starmer, B.S.<br>*Medicine* | Box 4969, Duke Station |
| Wilber Clarence Stewart, M.S.<br>*Electrical Engineering* | 1305-H Leon Street |
| Mitsuru Takata, Ph.D.<br>*Physiology* | Westover Park Apartments |
| Wilhelm Heinrich Tappe, Ph.D.<br>*Physics* | 916 Buchanan Boulevard |
| Sadanand A. Telang, Ph.D.<br>*Chemistry* | 206 Men's Graduate Center |
| Alberta Thiele, A.B.<br>*Surgery* | Box 1324<br>Chapel Hill, N. C. |
| Ichitaro Uematsu, Ph.D.<br>*Chemistry* | 1215 Clarendon Street |

| | |
|---|---|
| Winona B. Vernberg, Ph.D.<br>*Zoology* | Gloucester, N. C. |
| Norimitsu Watabe, D.Sc.<br>*Zoology* | 2205 Pike Street |
| Manfred Winnewisser, Ph.D.<br>*Physics* | 319-½ East Trinity Avenue |
| James F. Wolfe, Ph.D.<br>*Chemistry* | 1805 Morehead Avenue |
| Anton Zenhausern, Ph.D<br>*Chemistry* | 219-½ West Trinity Avenue |
| Rosemari Zischka, Ph.D.<br>*Surgery* | 1719 James Street |

## *Educational Administration*

| | |
|---|---|
| Robert Taylor Cole, Ph.D.<br>*Provost* | 7 Sylvan Road |
| Harold Walter Lewis, Ph.D.<br>*Vice Provost and Dean of Arts and Sciences* | 2307 Sprunt Street |
| Frank Traver de Vyver, Ph.D.<br>*Vice Provost* | 8 Sylvan Road |
| Barnes Woodhall, M.D.<br>*Vice Provost and Dean of the School of Medicine* | 4006 Dover Road |
| Everett H. Hopkins, A.M., LL.D.<br>*Assistant Provost and Vice President for Planning and Institutional Studies* | 2016 Campus Drive |
| Alan Krebs Manchester, Ph.D.<br>*Dean of Trinity College and Associate Dean of Arts and Sciences* | 406 Swift Avenue |
| Mary Margaret Ball, Ph.D.<br>*Dean of the Woman's College and Associate Dean of Arts and Sciences* | Dean's House, East Campus |
| James Lathrop Meriam, Ph.D.<br>*Dean of the College of Engineering* | 3434 Rugby Road |
| Richard Lionel Predmore, D.M.L.<br>*Dean of the Graduate School of Arts and Sciences* | 2535 Sevier Street |
| Robert Earl Cushman, B.D., Ph.D.<br>*Dean of the Divinity School* | 2022 Campus Drive |
| Elwood Scott Harrar, Ph.D.<br>*Dean of the School of Forestry* | 2228 Cranford Road |
| Elvin Remus Latty, J. Sc.D<br>*Dean of the School of Law* | 3620 Hathaway Road |
| Ann Madeline Jacobansky, R.N., M.Ed.<br>*Dean of the School of Nursing* | Faculty Apartments |
| Richard Lovejoy Tuthill, Ed.D.<br>*University Registrar* | 2709 Dogwood Road |
| Benjamin E. Powell, Ph.D.<br>*University Librarian* | 3609 Hathaway Road |
| William Lambreth Brinkley, Jr., M.P.S.<br>*Director of Undergraduate Admissions* | 2740 Dogwood Road |
| Olan Lee Petty, Ph.D.<br>*Director of the Summer Session* | 2605 McDowell Street |
| Robert Boyd Cox, A.M.<br>*Dean of Undergraduate Men* | 2319 Club Boulevard |

| | |
|---|---|
| Ellen Harris Huckabee, A.M.<br>*Dean of Undergraduate Instruction, Woman's College* | 618 Morehead Avenue |
| Mary Grace Wilson, A.M.<br>*Dean of Undergraduate Women* | Faculty Apartments |
| James T. Cleland, Th.D., D.D.<br>*Dean of the Chapel* | 2117 Campus Drive |
| Jane Philpott, Ph.D.<br>*Associate Dean of Undergraduate Instruction, Woman's College* | 2260 Cranford Road |
| Charles Rowe Vail, Ph.D.<br>*Associate Dean for Graduate Study and Research, College of Engineering* | 2730 Circle Drive |
| Francis Ezra Bowman, Ph.D.<br>*Assistant Dean and Director of Admissions, Graduate School of Arts and Sciences* | 2114 Woodrow Street |
| O. Kelly Ingram, B.D.<br>*Associate Dean of Students, Divinity School* | 2728 Sevier Street |
| William George Anlyan, M.D.<br>*Assistant Dean of the School of Medicine* | 1124 Woodburn Road |
| Robert L. Dickens, M.S., C.P.A.<br>*Assistant Dean of Arts and Sciences* | 2717 Circle Drive |
| Charles Buchanan Johnson, Ed.D.<br>*Assistant Dean of Trinity College* | 2714 McDowell Street |
| Barney Lee Jones, B.D., Ph.D.<br>*Assistant Dean of Trinity College* | 2622 Pickett Road |
| Dana Phelps Ripley, Ph.D.<br>*Acting Assistant Dean of Trinity College* | 2724 Erwin Road |
| Howard Austin Stroble, Ph.D.<br>*Assistant Dean of Trinity College* | 1119 Woodburn Road |
| C. Hilburn Womble, Ph.D.<br>*Assistant Dean of Undergraduate Men* | 1802 Sunset Avenue |
| Lillian Armfield Lee, M.S.Ed<br>*Assistant Dean of Undergraduate Women, Woman's College* | 25 Alastair Court, Swift Avenue |
| Edward Kready Kraybill, M.S.E.<br>*Assistant Dean, College of Engineering* | 2726 Circle Drive |
| Craufurd D. Goodwin, Ph.D.<br>*Assistant to the Provost* | 2256 Cranford Road |
| William J. Griffith, A.B.<br>*Assistant to the Provost* | 2518 Wrightwood Avenue |
| Robert L. Thompson, A.M.<br>*Executive Secretary, University Scholarship Committee* | 2615 Pickett Road |
| Clark R. Cahow, B.D.<br>*Assistant Registrar* | 1106 Watts Street |
| Carolyn M. Golding, A.B.<br>*Assistant to the Registrar* | 5155 Duke Station |
| Louise Seabolt, A.M.<br>*Recorder* | 12 Alastair Court, Swift Avenue |
| Margaret L. Coleman, A.M.<br>*Recorder, School of Medicine* | 918 Urban Avenue |
| Mrs. Dorothy Holt McElduff, A.B.<br>*Recorder, College of Engineering* | 100 Forestwood Drive |
| Mrs. Anne Merrill Dobson, B.A.<br>*Assistant Recorder* | 825 Louise Circle |

| | |
|---|---|
| Everett Broadus Weatherspoon, A.B.<br>*Director of Admissions, Trinity College and the College of Engineering* | 125 Pinecrest Road |
| Mrs. Elizabeth Anderson Persons, A.M.<br>*Director of Admissions, Woman's College* | 612 Swift Avenue |
| Frederick W. Daniels, A.B.<br>*Assistant to the Director of Undergraduate Admissions* | 1025 Lakewood Avenue |
| Michael Lewis Piper, A.B.<br>*Admissions Counselor* | 1601 Duke University Road |
| Ann Sugg, A.B.<br>*Admissions Counselor* | Murchison Apartments |
| Karl Milton Wilbur, Ph.D.<br>*Director of the Duke Marine Laboratory* | 2404 Bruton Road |
| F. John Vernberg, Ph.D.<br>*Assistant Director, Duke Marine Laboratory* | Beaufort, N. C. |
| Helen Mildred Kendall, A.B.<br>*Administrative Assistant and Secretary to the Faculty, Divinity School* | Faculty Apartments |
| Henry Weitz, Ed.D.<br>*Director of the Bureau of Testing and Guidance* | 2716 Circle Drive |
| Robert Merle Colver, Ed.D.<br>*Assistant Director of the Bureau of Testing and Guidance* | 2720 Circle Drive |
| Robert H. Ballantyne, Ed.D.<br>*Senior Counselor of the Bureau of Testing and Guidance* | 2316 Prince Street |

## *Business Administration*

| | |
|---|---|
| Gerhard Chester Henricksen, M.A., C.P.A.<br>*Vice President for Business and Finance, Treasurer* | 3629 Westover Road |
| Edwin Constant Bryson, LL.B.<br>*University Counsel* | 818 Anderson Street |
| John M. Dozier, A.B.<br>*Business Manager* | 2510 Wrightwood Avenue |
| Stephen C. Harward, A.B., C.P.A.<br>*Comptroller and Internal Auditor* | 2502 Sevier Street |
| Theodore Warren Minah, B.S. in H.M.<br>*Director of Dining Hall Operations* | 2117 Club Boulevard |
| Jesse David Wellons, Jr.<br>*Manager of Stores Operations* | 2703 Augusta Drive |
| Henry Franklin Bowers, A.B.<br>*Manager of Operations* | 2505 Perkins Road |
| Walter Glen Cooper, B.A.<br>*Personnel Director* | 2413 Prince Street |
| John Ellwood Doxey, A.M.<br>*Purchasing Agent* | 1004 Broad Street |
| William Kenneth Howard, B.S.<br>*Maintenance Engineer* | 106 Pinecrest Road |
| Henry David Mayfield, Jr., B.S.<br>*Supervising Architect* | 1400 Welcome Circle |
| William Edward Whitford, A.B.<br>*Director of Operation and Maintenance* | 146 Pinecrest Road |
| R. Homer Bass, A.B., C.P.A.<br>*Assistant Internal Auditor* | 104 Newell Street |

Ralph Earle, Jr., B.S., Vice-Admiral, USN (Ret.)
*Administrative Assistant* — 2501 Perkins Road

Ernest Lee Haywood, A.B.
*Chief Accountant* — 3512 Chapel Hill Road

Henry Speck Morgan, A.B.
*Bursar* — 2705 Brighton Road

Riley T. Smith
*Supervisor, Tabulating Department* — 2018 Wilson Street

Noma Sharp Clayton
*Manager, the Dining Halls, Men's Graduate Center* — 1412 Pennsylvania Ave.

Mary Robinson, B.S.
*Manager, the Dining Halls, Woman's College* — 2729 Circle Drive

Hugh L. Starnes, B.S.
*Manager, the Dining Halls, Men's Colleges* — 1710 Roxboro Road

## *Institutional Advancement*

Frank Leon Ashmore, A.B.
*Vice President for Institutional Advancement* — 2637 McDowell Street

Charles Edward Jordan, A.B., LL.D.
*Vice President for University Relations* — 615 West Campus Drive

Charles Aubrey Dukes, A.B.
*Assistant Vice President* — 1309 Oakland Avenue

Clarence E. Whitefield, A.B.
*Director of Information Service* — 3902 Darby Road, Hope Valley

Roger L. Marshall, A.B.
*Director of Alumni Affairs* — Rt. 3, Hillsboro, N. C.

Fred W. Whitener, A.B.
*Director of Special Events* — 1105 Woodburn Road

Betty E. McGuire, M.A.
*University Editor* — 109 Hilton Avenue

Thomas E. Broce, A.B.
*Foundation and Governmental Liaison Officer* — 2528 Sevier Street

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*Business and Industrial Liaison Officer* — 1202 Welcome Circle

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*Editor, Alumni Publications* — 2712 Legion Avenue

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Patsy G. McKay, A.B.
*Alumni Recorder* — Route 2, Roxboro Road

Thad W. Sparks
*University Photographer* — Melbrook, Cole Mill Road

W. James Wallace
*Assistant University Photographer* — 1735 Morehead Avenue

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David V. Martin, Ed.D.
*Coordinator of Institutional Studies* — 2312 Wilson Street

Robert Allison Maxwell, B.A.
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Paul Robey Bryan, Ph.D.
*Conductor of the Bands* — 1108 Watts Street

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| Lillian Lee, M.S.Ed.<br>*Assistant Dean of Undergraduate Women* | 25 Alastair Court |
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| Mrs. Mildred Little Hendrix, B.S.<br>*University Organist* | 144 Pinecrest Road |
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| James S. Young, M.M.<br>*Acting Director of Choral Music* | 876 Louise Circle |
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| Barbara Benedict, B.D.<br>*Associate Director of Religious Life, Woman's College* | Cornwallis Road |
| Arthur John Wilson, III, A.B.<br>*Associate Director of Religious Life, West Campus* | 4418 Guess Road |
| Jackson Walker Carroll, B.D.<br>*Chaplain to Methodist Students* | 2007 Ruffin Street |
| Elmer Cranford Johnson, Jr., B.D.<br>*Assistant Chaplain to Methodist Students* | Methodist Student Center |
| Charles Earl Johnson, B.D.<br>*Chaplain to Presbyterian Students* | 1013 Demerius Street |
| William Robert Mill, B.D., S.T.M.<br>*Chaplain to Episcopal Students* | 1110 Arnette Avenue |
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| James William Stines, B.D.<br>*Chaplain to Baptist Students* | 212 Edward Street |
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| Elbert L. Persons, M.D.<br>*Director of Student Health* | 723 Anderson Street |
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| Mrs. Ollie Phillips Burnett, R.N.<br>*Head Nurse, West Campus* | 1423 Pennsylvania Avenue |
| Mrs. Mary Eva Schofield, R.N.<br>*Assistant Head Nurse, West Campus* | 307 North Gregson Street |

# *Other Officers*

## DUKE UNIVERSITY PRESS

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| John C. Menapace<br>*Production Manager* | Route 1, Box 222 |
| John H. Langley<br>*Business Manager and Publicity Director* | 3506 Westover Road |
| Robert B. McPherson<br>*Assistant Editor* | 903 Monmouth Avenue |
| Mrs. Barbara S. Thompson<br>*Design and Production Assistant* | 169 Daniels Road, Chapel Hill, N. C. |

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| John Kennedy Hanks, M.A.<br>*Director of Voice Ensemble* | 1810 Glendale Avenue |
| James Henry, M.M.<br>*Director of Marching Bands* | 311 W. Delafield Avenue |
| William Klenz, Ph.D.<br>*Conductor of the Collegium Musicum* | 16 Rogerson Drive<br>Chapel Hill, N. C. |
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| Mrs. Eugenia Curtis Saville, M.A.<br>*Director of the Madrigal Singers* | 1103 Anderson Street |
| Loren Ralph Withers, M.S.<br>*Director of Piano Ensemble* | 2741 Dogwood Road |

## ART

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| Mrs. Fay S. Upchurch<br>*Assistant Slide Librarian* | 2321 Glendale Avenue |

## ATHLETICS

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| Edmund McCullough Cameron (1926), A.B.<br>*Director of Physical Education and Athletics* | 2818 Chelsea Circle<br>Hope Valley |
| John B. Abernethy (1963)<br>*Assistant Coach of Golf* | 904 Lancaster Street |
| Mrs. Florence N. Blalock (1959)<br>*Assistant Business Manager of Athletics* | Route 1, Erwin Road |
| James Robert Bly (1949), M.S.<br>*Coach of Soccer* | 410 Leon Street |
| Victor Albert Bubas (1959), B.S.<br>*Head Coach of Basketball* | 4040 Nottaway Road |
| Albert George Buehler (1955), M.A.<br>*Coach of Cross Country; Assistant Track Coach* | 4713 Stafford Drive |

| | |
|---|---|
| Herschel Amos Caldwell (1930)<br>*Assistant Coach of Football* | 3100 Devon Road, Hope Valley |
| Robert Lee Chambers (1933), B.S.Ed.<br>*Coach of Varsity Track; Head Trainer* | 2311 Prince Street |
| Robert Calvin Cox (1942), M.A.<br>*Assistant Coach of Football; Coach of Tennis* | 1913 University Drive |
| Charles John Daly<br>*Assistant Coach of Basketball* | 1309 Leon Street; Apt. B |
| Carmen M. Falcone (1946), M.A.<br>*Coach of Varsity Wrestling; Assistant in Football* | 1402 Woodburn Road |
| John A. Friedrich (1963), Ph.D.<br>*Chairman of Health and Physical Education Department and Assistant Director* | 2953 Welcome Drive |
| Ellis P. Hagler (1936)<br>*Coach of Varsity Golf; Manager Golf Club House* | Rt. 1, Cornwallis Road |
| Francis Parks Harrison (1947), Ph.D.<br>*Director, Intramural Athletics* | 2722 Circle Drive |
| William John Harvey (1960), B.S.<br>*Assistant Wrestling Coach* | N-3-A University Apartments |
| Carl Clifton James (1954), A.B.<br>*Assistant Athletic Director* | 2402 Wrightwood Avenue |
| John Douglas Knotts (1958)<br>*Assistant Coach of Football* | 2508 Sevier Street |
| Robert Agner Lutz (1960), B.A.<br>*Assistant Coach of Golf* | 959 Lambeth Circle |
| Hubert Murry Lewis (1937), B.S.<br>*Business Manager of Athletics* | 63 Beverly Drive |
| Michael Burnette McGee (1963), A.B.<br>*Assistant Coach of Football* | Apartment 5<br>Carwin Apartments |
| William D. Murray (1951), A.B.<br>*Head Coach of Football* | 2106 Campus Drive |
| E. Dixon Owens<br>*Assistant Trainer* | 2207-A Elder Street |
| Clarence McKay Parker (1947)<br>*Assistant Coach of Football, and Coach of Baseball* | 9 Westover Park Apartments |
| Walter Scott Persons (1930), A.B.<br>*Coach of Swimming; Coach of Lacrosse* | 612 Swift Avenue |
| Martin T. Pierson (1951), M.C.E.<br>*Assistant Coach of Football* | 2738 Circle Drive |
| Leroy Cornelius Skinner (1959), M.A.<br>*Assistant Coach of Lacrosse and Soccer* | 2018 Sunset Avenue |
| Raymond Chevalier Waters (1959), B.S.<br>*Assistant Coach of Basketball* | 3111 Sherbon Drive |
| Theodore Webster Youngling (1959)<br>*Assistant Coach of Football* | 524 Wofford Drive |

## HOUSE COUNSELORS, WOMAN'S COLLEGE

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| Barbara Shepherd, M.S.<br>*Counselor, Alspaugh House* | Alspaugh House |
| Nancy Carroll, M.A.<br>*Counselor, Aycock House* | Aycock House |

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| Joann Brabson, M.A.<br>*Counselor, Bassett House* | Bassett House |
| Mildred Donaldson Durden, M.Ed.<br>*Counselor, Brown House* | Brown House |
| Elizabeth Anne Hawks, M.A.<br>*Counselor, Gilbert House* | Gilbert House |
| Joyce Harris, A.B.<br>*Counselor, Giles House* | Giles House |
| Lynn Lanham, A.B.<br>*Counselor, Jarvis House* | Jarvis House |
| Mae B. Braswell, M.R.E.<br>*Counselor, Pegram House* | Pegram House |
| Ella Eugenia Shore, M.R.E., M.A.<br>*Counselor, Southgate Hall* | Southgate Hall |
| H. P. Sullivan, Ph.D.<br>*Experimental Dormitory* | Faculty Apartments |
| Mrs. H. P. Sullivan<br>*Experimental Dormitory* | Faculty Apartments |

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| Barbara Carpenter, B.S.<br>*Manager, the Dining Hall, Gilbert-Addoms* | Faculty Apartments |
| Mrs. Mae Eaton<br>*Dining Hall Supervisor, the Dining Halls, Men's Colleges* | 918 Plum Street |
| Harvey Grunke<br>*Assistant Manager, the Dining Halls, Men's Graduate Center* | Rt. 1, Box 5 |
| Joel W. Hobgood<br>*Dining Hall Supervisor, the Dining Halls, Men's Colleges* | 1508 Morning Glory Avenue |
| Marvin G. Johnson<br>*Assistant Manager, the Dining Halls, Woman's College* | 1304 North Duke Street |
| William D. Jones<br>*Supervisor of Banquet Service* | 1302 Rosewood Avenue |
| Jane McClung, B.S.<br>*Food Production Manager, the Dining Halls, Men's Colleges* | 707 Louise Circle |
| Mrs. Doris Martin<br>*Dining Hall Supervisor, Men's Graduate Center* | 200 West Enterprise Street |
| Winnie Maske<br>*Supervisor, the Coffee Lounge, Men's Graduate Center* | 3002 Mossdale Avenue |
| Mrs. Ruth R. Meier, B.S.<br>*Food Supervisor, the Dining Halls, Woman's College* | 3437-G Glasson Street |
| David Neal<br>*Night Manager, the Dining Halls, Men's Colleges* | Rt. 2, Box 102 |
| Susan Smart, B.A.<br>*Dining Hall Supervisor, Gilbert-Addoms* | Faculty Apartments |
| Alfred S. Stephens<br>*Personnel Manager, the Dining Halls, Men's Colleges* | 1408 Ruffin Street |
| Doris Williams<br>*Supervisor, the Oak Room, Men's Colleges* | 1808 East Pettigrew Street |

## THE UNIVERSITY STORES

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| Charles H. Rogers<br>*Operations Manager* | 1910 Wallace |
| Edward M. Greene, B.S.<br>*Merchandise Manager* | 202 East Club Boulevard |
| Harry E. Gentry<br>*Manager, Duke Hospital Store* | 2338 Huron Circle |
| Earl W. Wilson, A.B.<br>*Manager, University Bookstore* | 2734 Sevier Street |
| Allan J. Petch (Jeremy North)<br>*Bookman, The Gothic Bookshop* | Route 1, Box 204-A |
| Richard F. Barber, A.B.<br>*Auditor—Assistant to Manager Stores Operations* | 705 Reta Road |
| A. Raymond Jones<br>*Manager, Duke University Men's Store* | 104 Higbee Street |
| Leon S. Brooks<br>*Manager, Woman's College Store* | 904 Arnette Avenue |

## THE UNIVERSITY LIBRARIES

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| John P. Waggoner, Jr., B.D., B.S. in L.S.<br>*Assistant Librarian* | 2812 Devon Road |

## GENERAL LIBRARY

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| Mrs. Patricia M. Barrier, B.A.<br>*Assistant, Rare Book Room* | 2812 Carver Street |
| Mrs. Donna C. Bergholz, A.M.L.S.<br>*Descriptive Catologer* | 211 Vance Street<br>Chapel Hill, N. C. |
| Florence E. Blakely, M.A. (L.S.)<br>*Head, Reference Department* | 709 West Club Boulevard |
| Mrs. Charlotte Bond<br>*Bibliographer, Serials* | 3206-F Glasson Street |
| Barbara Branson, M.S. in L.S.<br>*Descriptive Cataloger* | 708 Louise Circle, Apt. E |
| Winston Broadfoot, A.B., LL.B.<br>*Director, George Washington Flowers Collection* | Lakeshore Drive<br>Chapel Hill, N. C. |
| Mrs. Marcia Caldwell, B.S.<br>*Assistant, Undergraduate Reading Room* | 3437-E Glasson Street |
| Mary W. Canada, B.S. in L.S., M.A.<br>*Reference Librarian* | 1312 Lancaster Street |
| Lena Covington, A.B. in L.S.<br>*Co-ordinator of Cataloging* | 2739 Sevier Street |
| Mary Ellen Darst, B.S. in L.S.<br>*Bibliographer* | 212 Faculty Apartments |
| Mary Dawson, M.S. in L.S.<br>*First Assistant, Descriptive Cataloging* | 880 Louise Circle |
| William R. Erwin, Jr., M.A.<br>*Assistant, Manuscripts* | 202 Faculty Apartments |
| Esther Evans, B.S.<br>*Subject Cataloger* | 708 Louise Circle |

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| Emerson Ford, A.B., B.D.<br>*Assistant, Circulation* | 2201½ Summit Street |
| Mrs. Virginia Gray, Ph.D.<br>*Assistant Curator of Manuscripts* | 124 Pinecrest Road |
| Mrs. Gerd H. Hall<br>*Biographer* | 3537 Hamstead Court |
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| William E. Hotelling<br>*Bibliographer* | 122 Purefoy Road, Chapel Hill, N. C. |
| Mrs. Bertha Jones, B.S. in L.S.<br>*Subject Cataloger* | 1015 Anderson Street |
| Mrs. Judith H. Kenyon, A.B.<br>*Assistant, Serials* | Apt. J-3-B, University Apts. |
| Mrs. Helgi Kernaghan, B.A., B.L.S.<br>*Serials Cataloger* | 3421-C Glasson Street |
| Dorothy F. Kirkland, A.B. in L.S.<br>*Descriptive Cataloger* | 1408 Washington Street |
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| Margaret Lenderking, B.A.<br>*Assistant, Circulation* | 1011½ Monmouth Avenue |
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| Mrs. Susan B. McCaughan, A.B.<br>*Assistant, Serials* | 1220-E Morreene Road |
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| Mrs. Nancy Mertel<br>*Assistant Circulation* | 1007 Rosehill Avenue |
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| Mary Frances Morris, M.S. in L.S.<br>*Reference Librarian* | 815 West Markham Avenue |
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| Mrs. Susanne L. Walton<br>*Descriptive Cataloger* | 2235 Cranford Road |
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| Mrs. Katherine Ripley<br>*Assistant, Circulation* | 704 Reta Road |
| Mrs. Cheryl Swan, B.A., M.A.L.S.<br>*Reference Librarian* | 803 Buchanan Blvd. |

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DIVINITY SCHOOL LIBRARY

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LAW SCHOOL LIBRARY

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| Katharine Day, B.S. in L.S.<br>*Assistant Librarian* | 116 Faculty Apartments |
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| Mrs. Donna Woodfin, A.B.<br>*Cataloger* | 936 Lambeth Circle |

MEDICAL CENTER LIBRARY

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| Mrs. Ruby Chen, M.L.S.<br>*Assistant Cataloger* | 2 Cranford Apartments<br>106 Buchanan Blvd. |
| Mrs. Polly G. Miller, A.B.<br>*Assistant Librarian* | 5B Williams Circle<br>Chapel Hill, N. C. |
| Miss Constance T. McDaniel, M.S.<br>*Chief Cataloger* | 1607 Fayetteville Street |
| Emil Frey, M.A.<br>*Acquisitions Librarian* | 1031 Dacian Avenue |
| Mrs. Ethel Gitlin, M.R.E.<br>*Assistant, Circulation* | 2508 Shenandoah Road |
| Mrs. Leo Thompson, A.B.<br>*Assistant, Circulation* | 924 Jones Circle |
| Miss Dorothy Mueller, M.A.<br>*Reference Librarian* | Elf Street |
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NURSING SCHOOL LIBRARY

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BIOLOGY-FORESTRY LIBRARY

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## COLLEGE OF ENGINEERING LIBRARY

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*Librarian* 3325 Chapel Hill Road

Mrs. Estelle C. Prince, B.A.
*Assistant* 2039 Englewood Avenue

## CHEMISTRY LIBRARY

Mrs. Mary E. Gaylor
*Librarian* 618 Morreene Road

## PHYSICS-MATHEMATICS LIBRARY

Mrs. Mary Cox, B.A.
*Librarian* 1913 University Drive

# UNDERGRADUATE INSTRUCTION

TRINITY COLLEGE

THE WOMAN'S COLLEGE

THE COLLEGE OF ENGINEERING

# The University

ALTHOUGH Duke University as a corporate entity dates from 1924, its roots go back nearly a century and a quarter to the Union Institute, founded in 1838 in Randolph County. Dedicated to the erasing of ignorance and error and to the education of responsible citizens, the Institute grew slowly for a decade. In 1859 it was formally organized as Trinity College, which laid solid foundations for the future. When the college moved to the growing city of Durham in 1892, it was able to find increased support both from the Church and from individuals who were dedicated to the aims of liberal education. During the next three decades, Trinity College drew to its faculty men of imagination, courage, and intellectual achievement who, in an atmosphere of academic freedom, created a notable liberal arts college.

The transition from college to university dates from James B. Duke's Indenture of Trust in 1924, through which Duke University came into being. The core of the new University was already in existence. This was Trinity College, which was joined in the ensuing years by three other undergraduate colleges, the Woman's College in 1925, the College of Engineering in 1939, and the School of Nursing in 1953. In the meantime, a number of professional schools were established as part of the total University structure. In hardly more than a generation Duke University was to attain a position of educational leadership and importance, both regionally and nationally, which remains one of the remarkable stories in American higher education.

The undergraduate colleges exist as important parts of the University, which by modern standards is moderate in size: they enroll about 3500 students in the total population of about 5800. Though they share the same campuses with the professional schools and many of the same facilities, and participate in the wide range of activities and educational advantages possible in a university environment, each of the colleges has its separate identity yet each is related to the others and to the University as a whole.

From college to university the basic principles have remained constant. The University motto, *Eruditio et Religio*, reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of students the objective has been to encourage each individual to achieve to the extent of his capacities an understanding

and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilites.

The undergraduate colleges of Duke Unversity are concerned with developing the whole person. In classrooms, libraries, and laboratories they are concerned with his mental and moral development, in gymnasiums and on playing fields, with his physical growth, and in the Chapel and religious program, with his spiritual well being. Although the University has always been closely associated with the Methodist Church, it welcomes students of all faiths and encourages them to develop their spiritual lives in accordance with the tenets of their own creeds. The need of training for specialized professions and employments is recognized, but such training is incidental to a larger purpose. Through the variety of the subject matter, the insistence on a common core of fundamental courses, and an emphasis on a more intensive study of some selected subject, the colleges seek to give their students a knowledge and appreciation of world culture and at the same time to provide a foundation for careers in business and the professions.

## *Location*

Duke University is situated in Durham, North Carolina, a city of about 85,000 population, 250 miles southwest of Washington, D. C., and 400 miles northeast of Atlanta, Georgia. From Washington, New York, and New England it may easily be reached by overnight trains of the Southern Railroad, or by air travel via Eastern Air Lines and United Air Lines. From the south and southwest both train and air services are available and frequent. From the Ohio Valley and the middle west frequent direct air travel is available via Eastern Air Lines from Chicago, Detroit, Cleveland, and via Piedmont Air Lines from Cincinnati and Louisville. By motor, Durham may be easily and pleasantly reached by a varied network of Federal and state highways, chiefly U.S. 15, 501, and 70, and by the new Interstate Highway 85.

The University is located on a tract of nearly 8,000 acres of rolling, wooded land on the southwest fringe of the city. The Woman's College is a mile and a half distant, within the city, on its own campus of 110 acres.

## *The Faculty*

It is the policy of the University to secure and to maintain a faculty of high competence in both teaching ability and research activity. In times of such rapid and far-reaching changes as we live in, teachers must ever be aware of new ideas, new climates of thought, new discoveries, whether they be in the sciences, in literature, or in philoso-

phy. Their interest in and capacity for original investigation and their contribution to the ever-developing body of human knowledge help to bring to life the materials which they teach and to communicate to the college student both the excitement and the essential significance and value of learning. This double function of the scholar-teacher tends to ensure the broadest and deepest experience available to students. In general all ranks in the instructional staff are assigned to the beginning as well as to advanced students, so that Freshman students are taught by many of the most competent teachers and most experienced scholars.

Beyond the physical limits of the classroom many opportunities exist for those students who wish and can utilize, for their own educational purposes, informal and friendly relationships with faculty members. These may be established through the regular advisory system, through extracurricular informal discussion groups, through identity of interests.

# Admission

NEW STUDENTS are admitted for the academic year at the opening of school in the fall.

The size of the entering classes is approximately as follows: Trinity College, 500; Woman's College, 340; College of Engineering, 175; the School of Nursing, 95. Since five thousand candidates normally apply and enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the colleges offer. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Although there are no inflexible subject matter requirements, at least fifteen acceptable units of secondary school credit must be presented. Of these at least twelve must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board. Candidates applying to the College of Engineering must include the appropriate mathematics test.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

## *Early Decision Plan*

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on either October 15 or February 1 of the student's senior year in secondary school. The deadline date for completing applica-

tions for October decision is September 15 and for February decision, January 1. Interested students should write to the Office of Admissions for detailed information.

## *Regular Admission*

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina, 27706. A non-refundable processing fee of $10.00 must accompany the submission of the full application form.

Candidates for admission to the School of Nursing should address their inquiries to the Dean of the School of Nursing, Hanes House, Duke University, Durham, N.C., 27706.

A candidate for admission who wishes to arrange an interview should do so through the Director of Admissions for the college or school concerned: the College of Engineering, Trinity College, the Woman's College, or the School of Nursing.

## *Admission to Advanced Standing*

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Office of Admissions, with a detailed account of their activities since withdrawal from college.

# Student Life and Services

## *The Libraries*

TO SUPPORT a rich educational experience in a world of rapid and far-reaching change, great library collections are essential. Undergraduate students at Duke are fortunate to have available exceptional resources. The University library, among the first sixteen university libraries in the country, contains 1,600,000 volumes and 3,000,000 manuscripts. About 50,000 volumes are added annually. Separate departmental and professional school libraries provide notable collections in the several disciplines.

The Woman's College library, with its own attractive Georgian building contains 140,000 volumes in an open stack collection, chiefly those books most frequently used in the undergraduate curricula. The larger collections of the main and specialized libraries are at hand when needed.

More detailed information may be obtained in a "Student's Guide to the General Library," available on request to the Librarian of the University.

## *Residence Halls*

As the undergraduate colleges of the University are resident institutions, all students are required to live in the residence halls. Any exception must be approved by the Dean of Men or the Dean of Women. Men students are assigned quarters on the West Campus, women on the East.

Detailed information concerning the student's obligations under the housing contract is sent to the men students by the University Housing Bureau upon their admission to the College. This information for women students is published in the Woman's College Handbook.

On the West Campus, Craven, Crowell, Few, and Kilgo quadrangles and Wannamaker Hall are occupied by undergraduate men. The houses in Kilgo and part of Crowell are reserved for members of the freshman classes of Trinity College and the College of Engineering, and each has a resident Head Housemaster and one or more Housemasters. A limited number of freshmen also reside in other houses where they live in community with upperclass students and a

Fellow, a faculty member or advanced graduate student who serves as their adviser.

On the East or Woman's College Campus all residence houses—Addoms, Alspaugh, Aycock, Bassett, Brown, Gilbert, Giles, Jarvis, Pegram, and Southgate—have both single and double rooms. These houses are alike in their organization. In each of them there is a resident House Counselor, who is a member of the Dean's staff, and full representation from all four classes, the appropriate number of places being reserved each year for freshmen.

## *Medical Care*

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester, and in the fees charged each student in the summer quarter.

The Service is under the direction of the University Physician with the cooperation of the Staff. It includes hospitalization in Duke Hospital, as deemed necessary by the Hospital Staff, but limited to thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Special nursing is not covered. Students pay for board while in the hospital. Refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernias, pilonidal cysts and other elective surgery, chronic skin conditions, endocrine disturbances, etc., are not included. The cost of any necessary braces and orthopedic appliances, and special nursing, must be borne by the students. Blood used for transfusions must be paid for or replaced.

If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. Accidents or illnesses occurring during vacations or while off the campus are not included in this service. A special commercial policy available only to regularly enrolled Duke students furnishes complementary protection, if desired.

Advisory consultation with a psychiatrist at no expense is available to students through referral either by the Student Health Physicians or by the Deans, but office visits for psychotherapeutic interviews are not included in this service.

A woman physician is in charge and a nurse in constant attendance at the Woman's College Infirmary. Women students receive ambulant care at regular office hours, and patients in this Infirmary can be transferred to the Duke Hospital at any hour of the day or night.

Male students receive ambulant care at the Student Health Office

in the hospital during regular office hours. The emergency service and the specialist consulting services of the Hospital and Medical School are always available.

Students are given careful physical examinations upon arrival at the University. Every applicant should be re-vaccinated against smallpox within three years before admission to the University. It is urgently advised that an oral vaccine routine for poliomyelitis be completed by all students and that all male undergraduates be actively immunized to tetanus by injections of toxoid.

Simple directions for procedure in reporting the students' needs for medical care are contained in the Student Handbook supplied to each student upon entering.

## *Special Services*

Other services of many kinds are available to all undergraduate students. Among these may be cited the educational, personal, and vocational counseling provided through the Bureau of Testing and Guidance. Through the Appointments Office, undergraduates are assisted in their search both for summer employment and post-graduation positions.

## *Physical Education*

Students of Trinity College and the College of Engineering who have no restrictive physical handicap must enroll in a physical education class each of four semesters. The first two of these four consists of prescribed activities designed to improve body control, growth and development through big muscle exercises; the last two semesters may be devoted to activity of the individual's choice from a number of sports of a recreational nature, such as badminton, basketball, golf, handball, swimming, tennis, and volleyball. A total of four semester hours credit toward graduation and quality points according to the marks assigned are awarded for these activities. In instances where the University Health Service examination indicates that specific types of activity may be beneficial, a modified program is available as medically prescribed. Normal credit is awarded for participation in the modified program.

In addition to the four semesters of required physical education, each student may voluntarily participate in the intramural program, which includes a dozen sports and attracts a large percentage of the student body. In a typical year more than 3,000 students forming fraternity, dormitory, and organizational teams, participate in seventeen tournaments and compete for more than fifty trophies.

For each semester of undergraduate enrollment, the student is

issued a uniform appropriate for the season and the activity in which he is engaging. The uniform is issued, exchanged, laundered, and maintained at no additional expense to the student.

The physical education program in the Woman's College is designed to give the students an appreciation of the value of activity for general physical well-being, skill in one or more activities which can be enjoyed as recreation during and after college, a well-developed and well-coordinated body, and a knowledge of good posture. To this end, students are allowed to choose from a large number of activities, including individual, dual and team sports, swimming, and several types of dancing. Each student during her two years of required physical education must elect one course in dance. Students who are unable to pass the swimming test must elect one course in swimming. Students whose test scores indicate special needs must elect a course in fundamentals of movement, rhythm, sports, or posture during the first half-semester.

Within the Woman's Recreation Association various clubs including Terpsichorean (modern dance), Nereidian (water ballet), and other sports groups offer opportunities for each student to take part in the various extra-curricular activities most interesting to her. The swimming pool, tennis courts, bowling alleys, and other athletic facilities are available to all students for use at specified times.

In order to maintain certain hygienic standards of physical education and intramural athletics, the University has made available for all students, in addition to facilities for physical activity and recreation, the following equipment and services:

1. Gym suit, dance leotard, bathing suit, warm-up suit.
2. Provision for locker and handling of uniform.
3. The laundering of uniforms and towel as needed.

## THE INTERCOLLEGIATE ATHLETIC PROGRAM FOR MEN

The program, controlled entirely by the University, consists of the organization and training of representative freshman and varsity teams in football, baseball, basketball, track, cross country, golf, lacrosse, soccer, swimming, tennis, and wrestling. In addition to these intercollegiate sports an informal fencing program is sponsored by the University.

The program is under the supervision of the Athletic Council, composed of seven members. Three of the seven are appointed by the President of the University from the faculty as follows: one member from the Officers of General Administration, one from the Officers of Educational Administration, division of the Colleges, and one from the Officers of Instruction of the undergraduate colleges. From this

group the President of the University appoints the faculty chairman, who serves as chairman of the Athletic Council and of its executive committee.

Four of the seven members are selected from the alumni. One of the four, a University Trustee, an alumnus, and a member of the Board's standing Committee on Physical Education and Athletics, is appointed not less frequently than every three years by the chairman of the Board of Trustees. The remaining three, who may not succeed themselves, are elected annually by the general Alumni Association for terms of three years. The Director of Alumni Affairs serves *ex officio* as secretary of the Council and of the executive committee.

The three faculty members of the Athletic Council constitute a committee which has the responsibility of enforcing the scholarship and athletic requirements of the University for participation in intercollegiate sports. The athletic eligibility rules are those of the Atlantic Coast Conference.

The executive committee of the Athletic Council is composed of the faculty chairman of the Council, one other faculty member of the Council and one alumni member of the Council. The executive committee of the Council recommends to the President of the University persons to serve as Director of Athletics and as coaches in the various sports. The election of such persons, however, rests solely with the Board of Trustees of the University or with its Executive Committee on recommendation of the President of the University. The Director of Athletics recommends to the Athletic Council athletic schedules and the award of insignia of merit earned by members of the athletic teams. These decisions are the responsibility of the Athletic Council subject to approval of the President.

Each of the four undergraduate classes selects annually, for a term of one year, a member of each respective class to serve in an advisory capacity to the Athletic Council on the matter of awarding insignia of merit.

All funds from athletic events are handled entirely by the Treasurer of the University. An audit of the receipts and disbursements of these funds is made annually by the official auditors of the University and a report thereof made annually to the Executive Committee of the Board of Trustees.

## *Social and Cultural Organizations*

Although the campuses for men and women are geographically separated, extra-curricular life is in many respects coeducational. Each campus has its own Student Government Association, its own inter-social councils, and its own local and individual groups. In many areas all of these meet for inter-college life. The scope of these

more than one hundred separate student organizations fall into many broad interest areas, such as student government, service, professional and honorary, publications and radio, music, drama, and social.

In the area of government, in addition to the Student Government Associations, are the Pan-Hellenic and Interfraternity Councils, the Independent House Association, and the Social Standards Committee. The Student Union, Symposium Committee, and the YMCA and YWCA groups are primarily service organizations. The Professional and Honorary organizations are numerous and include traditional Greek letter societies, such as Phi Beta Kappa, as well as national and local academic and leadership groups.

The Duke Chronicle, the campus newspaper, is published twice a week, and the student radio station, WDBS, operates daily. Three magazines and a comprehensive yearbook are published by students. Student publications are under the control of the Publications Board, composed of six members from the University staff appointed by the President; six men from the Junior and Senior classes, elected by the students in Trinity College and the College of Engineering; four women from the Junior and Senior classes, elected by the students in the Woman's College; and one from the Junior and Senior classes, elected by the students in the School of Nursing; and four editors and four managers of student publications, *ex officio* members without voting power. No student publication can be established at the University without the approval of the Board.

The musical groups include the Chapel Choir, Symphony Orchestra, Concert Band, Glee Clubs, and several smaller groups. The Duke Players present a number of plays and readings each season. The Hoof 'n' Horn Club annually produces a musical comedy which is written, cast, directed, and acted by students from the three colleges.

Other campus groups, social in nature, sponsor dances, chaperoned cabin parties, concerts, and informal discussion groups. Social functions are frequent enough to afford the relaxation needed from work required in class room and laboratory.

Approximately half of the undergraduate students belong to fraternities and sororities. Although there are no chapter houses, the program of fraternity and sorority activity is carried on within the sections of the regular dormitories or buildings set aside for this purpose. Eighteen national social fraternities and thirteen national sororities have chapters on campus.

The Union Building, located on the West Campus, is the student center for coeducational activities. It houses, among other groups, the Student Union organization. This body is unique in its coeducational aspects, bringing the men and women together in the carrying out of its stated purpose, "to stimulate, promote, and develop the social, recreational, cultural, educational, and spiritual activities of

the students of Duke University." This purpose is carried out through a broad program including lectures, concerts, recreational activities, dances, exhibits, etc., adapted to the leisure time interests and needs of all students, who as undergraduate students are members of the Union.

In one section of the West Campus Union are housed the Alumni offices, dining facilities, University store, grill, soda fountain, post office, barber shop, bank, and ball room. Elsewhere in the building are student organization offices, meeting rooms, an information center, and music, reading, lounge and recreational areas. Many similar service and activity areas for the Woman's College are provided on that campus.

## *Religious Life*

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

In the University Service of Worship on Sunday morning two hundred students participate by singing in the choir; at least one hundred other students aid in special ways, as ushers, collectors, and assistants in the communion services.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and six denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts,

other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

## *Reserve Officers Training Corps*

Through the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in providing well-educated officers for the regular and reserve forces of the Nation.

THE NAVAL RESERVE OFFICERS TRAINING CORPS: There are two basic programs through which students can qualify for Naval commissions upon graduation; one, the Regular Naval Reserve Officers Training Corps program, which provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, which leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve.

The Regular Student—Quotas are awarded on the basis of an annual nation-wide test and selection procedure. Students selected are appointed Midshipmen, USNR, and receive four years tuition, fees, and textbooks at government expense plus retainer pay at the rate of $600 per year. The regular midshipman may take any course leading to a baccalaureate or higher degree with certain exceptions, e.g., pre-medicine and medicine, pre-theological and theological, music and art. His academic program must include 21 semester hours of Naval Science, 3 semester hours of General Psychology, one year of college physics and one year of college mathematics. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering Degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.), the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.). The Regular midshipman participates in two summer training cruises aboard ship and receives aviation and amphibious indoctrination at naval shore stations for one summer. Upon graduation he receives a commission as Ensign in the Regular Navy, or Second Lieutenant in the Regular Marine Corps, after which he serves with the Navy or Marine Corps, as required by the Secretary of the Navy in the same manner as his officer contemporaries who are graduates of the U. S. Naval Academy. The minimum period of commissioned service is four years for regular officers.

The Contract Student—The contract student is selected from those regularly enrolled in Duke University who desire to qualify for a commission in the Naval or Marine Corps Reserve while pursuing

normal courses of study. Since he will be ordered to three years active duty immediately on graduation and commissioning, the Navy does not recommend that a medical, dental or theological student apply for this program. He must include in his academic program mathematics through trigonometry (if not successfully completed in secondary school), or one semester of college mathematics, 3 semester hours of General Psychology, and 21 semester hours of Naval Science. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.) the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.). He has the status of a civilian who has entered into a mutual contract with the Navy and is not eligible for the benefits and retainer pay received by regular midshipmen. He is paid a subsistence allowance during his last two years in the NROTC, however, amounting to twenty-seven dollars a month. He goes aboard ship for one summer training cruise, normally between his junior and senior years. Upon graduation, he is commissioned in the Naval or Marine Corps Reserve and reports for a minimum of three years active duty. Upon completion of the minimum active service requirements he may request transfer to the regular component of the Navy or Marine Corps, retention on active duty as a reservist, or transfer to the inactive reserve.

Both Regular and Contract midshipmen are deferred from Selective Service by virtue of their commitment to serve on active duty after graduation. The Navy furnishes necessary uniforms and equipment. Uniforms are worn only on drill days or other special occasions when prescribed by the Professor of Naval Science. Regular and Contract students receive the same instruction and wear the same uniforms. No distinction is made between the two in the NROTC Unit. Contract students may compete each year for the Regular Program, and if selected, they will be appointed to Regular status with the subsequent benefits.

### THE AIR FORCE RESERVE OFFICERS TRAINING CORPS:

The unit functions as a regular department of instruction known as the Department of Air Science. It selects and trains students who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers.

For enrollment in the Basic Course (freshmen and sophomore years) the student must: be a male citizen of the United States; be physically qualified under standards prescribed by the Air Force (due allowance will be made for defects which are correctable prior to the student's eligibility for appointment as a commissioned officer); be accepted by the institution as a regularly enrolled student; be not

less than 14 years of age and not have reached 23 years of age at the time of enrollment; must successfully complete such general survey and screening tests as may be prescribed; and must sign a loyalty certificate with the U. S. Government. Students initially entering the University who have had previous preparatory or high school military training are normally accepted in Basic Air Science at the same academic level as that in which they are accepted by the University.

For enrollment in the Advanced Course (junior and senior years) the student must have successfully completed the Basic Course or have had at least one year of honorable service in the Armed Forces of the United States; must execute a written agreement with the government to complete the Advanced Course *and accept a commission in the United States Air Force Reserve,* contingent upon remaining in school, and to attend Advanced Summer Training at the time specified; must agree to take orientation flights when offered; must be less than 28 years of age at the time of graduation; must successfully complete such general survey and screening tests as may be prescribed and must be selected by the Professor of Air Science and the appropriate authority of the University.

Students in the Basic Course may be deferred from Selective Service upon satisfactory completion of one semester of Basic Air Science. Advanced students are deferred as soon as they are enrolled formally in the Advanced Course.

All uniforms, texts, and training equipment required for the Air Science Course are furnished at government expense, and students are paid a total of approximately $600.00 for the two years of the Advanced Course.

A thirty-five (35) hour Flight Instruction Program using light aircraft is restricted to seniors who may, upon completion of the course, qualify for a Civilian Private Pilots License. To participate in this program, Fourth Year Cadets must be physically and aptitudinally qualified for the Air Force Flight Instruction Program.

Upon graduation and completion of the Advanced Course, selected students for flying or line assignments will be offered commissions as Second Lieutenants in the Air Force Reserve. Reserve Officers who desire lifetime careers in the Regular Air Force may apply for regular commissions after serving on active duty for one year. An Air Science student who maintains a high academic and aptitudinal average is eligible for designation as a Distinguished AFROTC Cadet and later, a Distinguished AFROTC Graduate. A designee, if fully qualified, will receive a regular commission upon graduation.

# The Summer Session

THE SUMMER SESSION at Duke University makes available to Duke undergraduate students and to undergraduates from other universities and colleges a notable program of instruction in many fields of knowledge both academic and professional.

Undergraduates in Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two and one-half summer sessions.

Undergraduates from other colleges and universities may enjoy the special advantages of summer instruction at Duke and transfer their earned credits to their own institutions.

The Summer Session of 1963 will include two terms: Term I, June 11 to July 17; Term II, July 18 to August 23. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

Instruction of interest to undergraduates will be offered in the summer of 1963 in the following departments and colleges: Botany; Chemistry; Economics and Business Administration; Education; Nursing; Engineering; English; Forestry; French; Geology; German; Greek; Health and Physical Education; History; Latin and Roman Studies; Mathematics; Philosophy; Physics; Political Science; Psychology; Religion; Sociology; Spanish; and Zoology.

Distinctive features of Summer Session instruction are provided by the program in marine biology offered at the Duke Marine Laboratory, Beaufort, North Carolina, and by various conferences in several of the Departments.

While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program both athletic and social.

Undergraduates of Duke University, both men and women, who plan to attend the Summer Session should enroll with the Dean of their own college in Duke University. Undergraduates in other universities or colleges who seek transfer credits should apply directly to the Director of the Summer Session, Duke University, Durham, North Carolina.

# Financial Information

THE prospective student who seeks the optimum opportunity in higher education will not be a bargain hunter. Certainly, some sound plan for paying the cost of college must be devised, but this plan should be formulated after the thoughtful selection of an institution has been made. No college or university can honestly say that an education at the college level is inexpensive. Most university people and the ever growing college alumni families across our nation, however, will reflect the feeling that the benefits derived from a college education constitute a handsome return on the dollars invested.

Each student going to college should analyze carefully his financial situation. In making such analysis it should be recognized that the primary responsibility for defraying the cost of an education lies with the student and his family. The typical college student can depend upon some contribution from his family's current income, a proportionate share of family savings, and anticipated income from summer employment. The number of years of study contemplated and the number of dependent children in the family should be considered in computing the funds which will be available in a particular year.

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

## ESTIMATED EXPENSES FOR AN ACADEMIC YEAR

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

| *Undergraduate Men* | | *Undergraduate Women* | |
|---|---|---|---|
| Tuition | $1,050.00 | $1,050.00 | |
| General Fee | 187.00 | 187.00 | |
| Room Rent | 250.00 | 275.00 | |
| Board | 500.00 (Cafeteria estimate) | 450.00 | (Board Rate) |
| Books and Supplies | 70.00 | 70.00 | |
| Miscellaneous Expenses | 443.00 (Moderate estimate) | 443.00 | (Moderate estimate) |
| Totals | $2,500.00 | $2,475.00 | |

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of $2,500.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

## *Tuition and Fees*

The tuition of $525.00 and the general fee of $93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

New students, on notification of acceptance, are required to pay a non-refundable first registration fee of $20.00 and to make a deposit of $50.00. The $50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, $25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining $25.00 as a continuing registration deposit. Arrangements for refund of the $25.00 room deposit are described in information furnished each resident student by the Housing Bureau. The $25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

Students who have been readmitted to the University after an absence of one or more semesters, on notification of readmission, are required to make the $50.00 room and registration deposits.

An Air Force ROTC deposit of $20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

## *Living Accommodations*

Rooms are rented for a period of not less than one semester. No refund will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

In the residence houses for undergraduate men the rental charge for a single room is $300.00 for the academic year or $150.00 for each semester. The rental charge for a double room is $500.00 for the

academic year or $250.00 for each occupant, or $125.00 per semester for each occupant.

In the residence houses for undergraduate women, the rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant, or $137.50 per semester for each occupant.

The dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room, where full meals and *a la carte* items are served. The cost for the academic year ranges from $450.00 upward depending on the taste of the individual.

On the Woman's College Campus, dining halls are located in the Woman's College Union and in Gilbert-Addoms residence hall. Resident women will board in these halls. The charge for board is $225.00 per semester, payable at the time of registration. There will be no board refund for withdrawal after six weeks from the beginning of class; a refund will be made on a pro rata basis for withdrawals occurring during the first six weeks.

Because of the large number served in the dining halls, it is not possible to arrange special diets for individual students.

## *Other Information*

In the regular academic year students who register for no more than two courses with a maximum credit of 8 semester hours are classified as special students. They are charged a registration fee of $5.00 for each course and $35.00 for each semester hour of course credit. Registration for 9 or more semester hours, or 3 or more courses, requires payment of full fees.

Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than 8 semester hours may audit other courses by payment of $15.00 for each course audited.

In order to encourage its employees in their professional and personal advancement, Duke University will permit full-time employees that are paid on a monthly basis to take one or two courses, but not more than seven semester hours and will charge $5.00 per course plus $15.00 per semester hour.

One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Treasurer for all indebtedness.

Bills may be sent to parents or guardians provided the Treasurer

has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

## *Financial Aid*

Duke University is interested in students with ability and ambition. It is the aim of the University Scholarship Committee and others affiliated with the Student Aid Program to provide, insofar as possible, the financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans and part-time employment.

In 1963-64 financial aid totaled $1,859,000. Of this amount $959,000 was allotted to 1,216 undergraduate students in the form of scholarships, grants-in-aid, and remissions of tuition; $500,000 in student loans, and approximately $400,000 through part-time employment on the campus and in the city of Durham and the surrounding area.

Freshmen students shared proportionately in this aid: 441 received awards totaling $335,686 in direct assistance not including loans or part-time employment.

SCHOLARSHIPS: All requests for applications for scholarships, grants-in-aid, industry scholarships or remissions of tuition should be addressed to the Office of Admissions, Duke University, Durham, North Carolina.

All candidates for scholarships and grants-in-aid must submit an official Application for Admission to the University and the Application for Scholarship to the office of Admissions. Scholarship candidates who desire to be considered for the maximum value of scholarships on the basis of financial circumstances are required to submit the "Parents' Confidential Statement" of the College Scholarship Service. The "Parents' Confidential Statement" may be obtained from high school principals or upon request from the Student Aid Office.

Scholarship candidates should initiate their applications during the fall semester of their senior year of study in secondary schools. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for scholarships and grants-in-aid.

Awards annually available to undergraduate students at Duke University fall into eight major categories. These are:

(1) *Angier B. Duke Memorial Scholarships:* Recipients of these awards are students whose superior records mark them as young men and young women who give outstanding promise of becoming leaders in their chosen fields of endeavor.

Number available: 31 for each Freshman class.
Value: $200.00 to $2,400.00 annually.

(2) *W. N. Reynolds Memorial Scholarships:* Recipients of these awards are students of outstanding ability, superior records and the promise of constructive leadership. In considering candidates for the awards, first consideration will be given to:

1. Children of employees of R. J. Reynolds Tobacco Company or any of its affiliates or subsidiaries.
2. Children of families residing in Forsyth County, North Carolina.
3. Other candidates who are residents or natives of North Carolina.

(3) *Duke University School of Nursing Scholarships:* Recipients of these awards are young women whose superior records indicate outstanding promise of becoming leaders in the profession of Nursing.

Number available: 11 for each Freshman class.
Value: $200 to $1,200.00 annually.

(4) *Huguenot Scholarship:* A scholarship of $1,000.00 per year is available from the Huguenot Society of America to a decendant of a Huguenot ancestor.

(5) *Grants-in-Aid:* Recipients of these awards are able students who need financial assistance in order to meet the cost of attending college.

Number available: Approximately 400 annually.
Value: From $100.00 to $1,500.00 annually.

(6) *Remissions of Tuition:* Children of ministers in the North Carolina and Western North Carolina Conferences of the Methodist Church who are resident in the conference and children of ministers of all faiths residing in Durham County are eligible to receive a remission of the tuition charge for a maximum of eight semesters of undergraduate study at Duke University.

(7) *Tuition Grant:* Tuition grants are available to children of certain qualified staff members of Duke University for a maximum of eight semesters of undergraduate study at Duke University.

(8) *Corporate Scholarships:* Certain scholarships financed by private corporations are available annually to undergraduate students at Duke University. The selection of the recipients of these awards is made by the University Scholarship Committee. These scholarships are assigned to students whose records of scholarship and leadership are outstanding and whose financial need can be demonstrated.

Number available: 18.
Value: $500.00 to $2,000.00 annually.

CHRISTIAN VOCATIONS SCHOLARSHIPS: Students preparing to enter full-time religious work are eligible to apply for special consideration on the basis of need. These students will be required to submit the "Parents' Confidential Statement." Students with need will be recommended by the Executive Secretary of the University Scholarship Committee to the Christian Vocations Scholarship Committee which will consider the intention of the applicant. Students approved by the Christian Vocations Scholarship Committee are required to sign a note each semester for the amount of financial assistance granted to them by the University Scholarship Committee. These notes will be cancelled upon evidence that the student has entered full time Christian work after graduation. Pre-ministerial and religious education students ranking in the upper quarter of their graduating classes are encouraged to apply for an Angier B. Duke Memorial Scholarship.

AWARDS FOR FOREIGN STUDENTS: A limited number of awards will be made each year to qualified students from other countries who are accepted by the Office of Admissions as entering freshmen or as students with advanced standings. Candidates for these awards are required to submit the "Application for Scholarship" and the "Parents' Confidential Statement" of the College Scholarship Service provided by the Financial Aid Office of Duke University.

STUDENT LOANS: Students who have completed at least one semester in residence and who have satisfactory academic and citizenship records are eligible to apply for student loans. Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958, are available to qualified students.

Loans generally mature after borrowers have left the University. Loan interest on long term loans from University funds accrues at the rate of 1% from the date of each note. After a student has left the University permanently, the loans begin bearing interest at the rate of 3% per annum. The balance unpaid after five years bears interest at the rate of 6% per annum.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of loan funds under the National Defense Education Act of 1958 normally begins one year after the student terminates his education at the University, with complete repayment scheduled within a ten-year period. Interest accrues at the rate of 3% commencing one year after the borrower ceases to be a full-time student at an institution of higher education. Special benefits to those teaching in the public schools permit a portion of the loan to be cancelled depending upon the length of teaching

service. Complete details regarding the student loan program may be obtained by writing directly to the Student Loan Office.

The Student Loan Committee in approving loan applications selects those students who, from the standpoint of character, scholastic attainment, personality and degree of financial need, are deserving of this consideration. A student in residence may not, without special permission, own or operate a car during the academic year for which the loan is granted. Loan applications must be submitted not later than July 1, preceding the academic year for which assistance is requested.

STUDENT EMPLOYMENT: The Financial Aid Office maintains an employment office to serve students who need part-time jobs. There are many opportunities both on the campus and in the city of Durham. A considerable number of students each year help defray their college expenses by working.

Students may apply for part-time employment after they have received official notification of acceptance from the Office of Admissions. Such requests for employment should be made by letter prior to the date of entrance.

Those students in Trinity College and the College of Engineering in need of part-time employment should apply to the Financial Aid Office, Duke University, Durham, North Carolina. Students in the Woman's College should apply to the Assistant Dean of Undergraduate Women, 108 East Duke Building, Duke University, Durham, North Carolina.

# Medals and Prizes



THE achievements of undergraduate students are recognized in various fields of college activity. The following prizes suggest the range of the recognition:

The *Debate Council* authorizes the awarding of medals to members of the graduating class who have represented the University in at least two intercollegiate debates. The medals are given by the local chapter of the Tau Kappa Alpha Fraternity.

The *Robert E. Lee Prize* is the gift of the late Reverend A. W. Plyler, of the class of 1892, and Mrs. Plyler. The sum of $50 is awarded annually at Commencement, preferably to that member of the senior class of Trinity College or the College of Engineering who, in character and conduct, in scholarship and athletic achievement, in

manly virtues and capacity for leadership, has most nearly realized the standards of the ideal student. The Vice-President in the Division of Student Life, the Graduate Director of Athletics, and the President of the Student Council constitute a committee to draft and adopt regulations governing the award.

*Alpha Kappa Psi Medallion.* Beta Eta Chapter of Alpha Kappa Psi, a professional fraternity in commerce, awards annually the Alpha Kappa Psi Scholarship Key to the male senior student pursuing a degree in the Department of Economics and Business Administration who has attained the highest scholastic average for three years of collegiate work in this University.

*Medal of the North Carolina Association of Certified Public Accountants.* The North Carolina Association of Certified Public Accountants annually awards a medal to the senior who, in the judgment of his instructors, is the most outstanding student in accounting in his graduating class.

*Julia Dale Prize in Mathematics* is a prize of books given annually to the undergraduate who shows the greatest proficiency in the study of calculus.

*The Milmow Prize* consists of a certificate of award and a one year's payment of dues in the American Institute of Electrical and Electronic Engineers for the membership year in which the honoree is awarded his baccalaureate degree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department and as shown by his grades, has made the most progress in electrical engineering during his last year in college.

*The George Sherrerd III Memorial Award in Electrical Engineering* was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. This award, consisting of the income from a fund of $5000.00, is made annually to that senior student in Electrical Engineering who, in the opinion of the Electrical Engineering faculty, has attained the highest level of scholastic achievement in all subjects and simultaneously has rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

*The Charles Ernest Seager Memorial Award,* established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the American Institute of Electrical and Electronic Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

*The American Society of Civil Engineers Prize* consists of a certifi-

cate of award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the Student Chapter, and his participation in other college activities and organizations.

*The Tau Beta Pi Prize.* The North Carolina Gamma chapter of Tau Beta Pi, engineering national honor society, awards each year a suitable prize, such as an engineering handbook, to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

*The Phi Lambda Upsilon Prize.* Phi Lambda Upsilon, honorary chemical society, yearly awards a suitable prize to an outstanding junior who is majoring in chemistry. The recipient's name is inscribed on a plaque displayed in the Chemistry Library.

*The Pegram Chemistry Club Prize* is awarded in the spring of each year for scholarship in chemistry, physics, and mathematics. The prize consists of a one-year junior membership in the American Chemical Society and a one-year subscription to either the *Journal of the American Chemical Society* or *Industrial and Engineering Chemistry.* To qualify for this prize, the student must (1) be enrolled as an undergraduate of Duke University and (2) be taking or have taken a fourth-year chemistry course. The winner of this prize is selected by a committee consisting of at least one faculty member and at least two members of the Pegram Chemistry Club; the selection is based on the quality-point average for all courses taken in chemistry, physics, and mathematics. In case of a tie equal awards are given.

*The James B. Rast Memorial Award* in Comparative Anatomy is given annually by the parents of James Brailsford Rast in memory of their son, a member of the class of 1958 at Duke University. The award, consisting of the *Atlas of Descriptive Human Anatomy* by Sobotta and bearing the James B. Rast Memorial bookplate, is given to the student who demonstrates the greatest achievement in the study of Comparative Anatomy.

*The Erasmus Club Prize in the Humanities.* The Erasmus Club is composed of a group of Duke faculty members interested in research in language, literature, and the arts. It seeks to stimulate interest and study in these fields. To encourage undergraduate students in this field, the Erasmus Club has established an annual prize amounting to $25.00, for the best original essay by an undergraduate which embodies the results of research, criticism, or evaluation in some subject in the humanities. Prospective competitors should consult a professor in their major field. Essays must be typewritten and must be submitted to the president of the club before the first of April.

The Club reserves the right to withhold the prize in case there are no essays of acceptable quality.

*The Anne Flexner Memorial Award in Creative Writing* has been established by the family and friends of Anne Flexner, who graduated from Duke in 1945. It consists of fifty dollars in cash and a number of books chosen by the student. The award is given annually for the best piece of creative writing submitted by a Duke undergraduate. The competition is limited to short stories (5,000-word limit), one-act plays (5,000-word limit), poems (100-line limit), and informal essays (3,000-word limit). Only one manuscript may be submitted by a candidate, and it must be delivered to the English Office, Room 325 Allen Building, before April 15.

*The William Senhauser Prize* is given by the mother of William Senhauser in memory of her son, a member of the Class of 1942, who lost his life in the Pacific Theatre of War on August 4, 1944. The award is made annually to the sophomore or junior in Trinity College or the College of Engineering who has made the greatest contribution through participation and leadership in intramural sports. The winner of this prize is chosen by a committee selected by the President of the University.

The *Friends of Duke University Library* offer three prizes in an annual contest open to all undergraduate students for the best book collections acquired during their college year. The contest is supervised by the Undergraduate Committee of the Friends of the Library, which announces each fall the terms of the award. Inquiries may be directed to the Curator of Rare Books. Collections entered in the contest are exhibited each spring in the General Library. The prizes are awarded on the basis of the student's collection, a personal interview to determine the overall planning and objectives of his collecting activity, and his familiarity with his own books and the general field of his collecting interest.

*The William T. Laprade Prize in History* in honor of William T. Laprade, who was a member of the History department at Trinity College and Duke University from 1909 to 1953, and chairman of the department from 1938 to 1952. This prize is awarded to that senior who is graduating with distinction and whose senior essay in history has been judged unusually meritorious.

*Algernon Sydney Sullivan Award.* This award is provided by the New York Southern Society. Three awards may be made each year: one to a member of the senior class of Trinity College or the College of Engineering, one to a senior in the Woman's College, and one to a member of the staff of the University or the community. "In the selection of the recipients nothing shall be considered except the possession of such characteristics of heart, mind, and conduct as evince a spirit of love for and helpfulness to other men and women."

# General Academic Regulations

## *Trinity College and Woman's College*

QUANTITY CREDIT AND COURSE LOAD: The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work. Two semesters of seventeen weeks each constitute the academic year. For the degree of Bachelor of Arts or Bachelor of Science, credit for 124 semester hours is required.

Selected superior students are given the opportuntiy to earn credit for independent study and research in programs approved and supervised by the faculty.

The normal load for an undergraduate student is four or five academic courses totaling 14 to 17 semester hours, exclusive of physical education. The maximum number permitted is 19 semester hours, exclusive of physical education. No student is permitted to take less than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than C.

COURSE AUDIT: With the consent of the instructor, the student is allowed to audit one or more courses in addition to the normal load. After the first week of classes in any semester, no student classified as an auditor in a particular course may take the course for credit, and no student taking a particular course for credit may change classification to an auditor. Under no circumstances may a student repeat for credit any course he has previously audited. Auditors submit no daily work, take no examinations, and receive no credit for courses.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are determined by grades as follows: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points. Credit for at least 248 quality points is required for the degree of Bachelor of Arts or Bachelor of Science.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION FROM COLLEGE: To continue in college students must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours, achieve a

specified quality point ratio (q.p.r.), and earn a minimum number of quality points. The quality point ratio is calculated by dividing the accumulated number of quality points earned by the accumulated number of semester hours carried (not semester hours passed). These requirements are listed in the following table:

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 18 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 42 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 66 s.h. credit and a q.p.r. of 1.70 |
| The fourth to the fifth year, if needed | 90 s.h. credit and a q.p.r. of 1.80 |

For graduation the minimum requirement is 124 s.h., 248 q.p. and a q.p.r. of 1.90. Students of the senior class, in order to be eligible for graduation, must complete the work of their senior year with a minimum average grade of C.

CLASS STANDING: To rank as sophomores, students must have to their credit at least 26 semester hours and 52 quality points; as juniors, at least 56 semester hours and 112 quality points; and as seniors, at least 90 semester hours and a quality point ratio of 1.80.

Seniors may not take for graduation credit any course open primarily to freshmen without the recommendation of the Director of Undergraduate Studies of their major department and the approval of the Dean. Juniors may not take for graduation credit more than one course open primarily to freshmen without a similar recommendation and approval.

Seniors who at the beginning of a semester lack no more than 9 semester hours for the fulfillment of the requirements for the A.B. or B.S. degree may enroll, with the approval of the Dean of the Graduate School, in graduate courses for a maximum total program of fifteen hours a week.

## *College of Engineering*

QUANTITY CREDIT AND COURSE LOAD: The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work. Two semesters of 17 weeks each constitute the academic year. For the degree of Bachelor of Science in Engineering, credit for a minimum of 142 semester hours is required.

The normal load is 16-19 semester hours, exclusive of physical education. No student is permitted to take less than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than C.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are earned by a student on the basis of his grades: for an A, four quality

points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION: To continue in college and to graduate, a student must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours and achieve a specified quality point ratio (q.p.r.). The quality point ratio is based solely on work performed at Duke and is calculated by dividing the total number of quality points earned by the total number of semester hours attempted at Duke. These requirements are listed in the following table:

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 18 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 48 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 78 s.h. credit and a q.p.r. of 1.70 |
| The fourth to the fifth year, if needed | 108 s.h. credit and a q.p.r. of 1.80 |

For graduation the minimum requirement is 142 s.h., a q.p.r. of 1.90, and a q.p.r. of 2.00 in senior work. A minimum average grade of C in all courses taken in the last year, combined with all courses designated for the senior year in the particular engineering curriculum.

ACADEMIC CLASS STANDING: *To be classified as a sophomore,* a student must have to his credit at least 22 semester hours and must have passed certain specially designated courses of the freshman engineering curriculum. *To be classified as a junior,* he must have to his credit at least 62 semester hours and must have passed certain specially designated courses of the sophomore departmental engineering curriculum. *To be classified as a senior,* he must have to his credit at least 102 semester hours and must have passed certain specially designated courses of the junior departmental curriculum.

## *Trinity College, Woman's College, and College of Engineering*

RESIDENCE REQUIREMENTS: The final four semesters—or equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, 30 of these 60 semester hours must be from those normally taken in the senior year. Students who meet this requirement but who still lack 6 to 8 semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the chairman of their major department and by the dean.

Students who complete in a summer session the work required by the University for the Bachelor's degree will be granted the degree at the end of the summer.

DISMISSAL: In addition to the qualitative standards listed above students must pass a minimum number of hours each semester. Freshmen must pass at least 6 semester hours of work in their first semester, 9 semester hours in the second semester (in engineering 3 required courses), and 18 semester hours in their first year; all other students must pass at least 9 semester hours each semester. Physical education credits are excluded in each case. The University may require a student whose record is considered unsatisfactory to withdraw, although he has met the minimum requirements set forth in this paragraph.

GRADING: Final grades are reported to indicate passing or failing work in designated courses. Final grades are:

(1) *Passing.* Passing grades are A, exceptional; B, superior; C, average; and D, low pass.

(2) *Failing.* A grade of F indicates that the student has failed the course and that in order to receive credit for the course he must repeat the work in class.

Special symbols are used to indicate the following:

(1) *Absence from the final examination.* In all cases in which the student is absent from a final examination, he receives an X instead of a final grade. If he does not present an acceptable explanation for his absence to the appropriate dean's office within forty-eight hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of $5.00 to the Treasurer of the University. The instructor concerned arranges for examination in cases where absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

(2) *Incomplete work.* If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be repeated in class if the student is to receive credit for it. In case a student whose work is incomplete is also absent from a final examination, he receives an X for the course.

(3) *Withdrawal.* The letter W is used to indicate official withdrawal from a course. If a student drops a course without permission from the Dean, the grade for that course is recorded as F. If he drops with permission a course in which he is failing, the grade for that course is recorded as F unless, in the judgment of the Dean, circumstances do not justify this penalty.

REPORTS: Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semes-

ter. In addition, six-weeks advisory grade reports on freshmen are mailed each semester.

ATTENDANCE REGULATIONS: The attendance regulations specifically place the responsibility for class attendance upon the individual student. A student is expected to attend his classes regularly and punctually. It should be recognized that one of the most vital aspects of a residential college experience is attendance in the classroom, and that the value of this academic experience cannot be fully measured by testing procedures alone. The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance; and, conversely, to recognize and accept the consequences of failure to attend. Instructors are privileged to refer to the dean for appropriate action any student who in their opinion is causing his work or that of the class to suffer because of absences or latenesses.

Because there will be a concentration of pressures on members of the student body to extend holiday periods, and because severely limited attendance would be detrimental to the conduct of the class as a whole, the following severe sanction is imposed for unexcused absences immediately before or after a holiday period: *Any unexcused absence of a student on his last class day before or his first class day after an official holiday period shall result in suspension from the University.* This suspension shall be immediate except when the absence is before or after the Christmas holidays, in which case the suspension will not take effect until the end of the fall semester. The student may apply for readmission for the semester following suspension. No instructor has the authority to waive these regulations.

The summer recess and the period between semesters is not a "holiday period" within the meaning of this regulation. In order to ensure the orderly beginning of classes and to make class spaces available to students who are in residence, the following regulations apply: Registration in a course shall be forfeited if a student does not attend the first meeting of the class and the space so vacated will be made available to another student. If a student whose absence has not been excused returns within the first week of school, he must reregister for his courses. A student who returns after the first week may not enroll that semester and will be required to apply for readmission.

Absences from required classes due to illness will be excused when certified by a proper medical official. Absences from required classes due to authorized representation of the University may be excused. Officials in change of groups representing the University are required to submit names of those persons to be excused to the appropriate

dean's office forty-eight hours in advance of the hour when their absences are to commence.

EXAMINATIONS: Final examinations are held in all subjects in January and May.

ADVANCED PLACEMENT: The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to sophomore-level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, while the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the deans of the colleges are charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board.

ADVANCED PLACEMENT COURSE CREDIT: Any student who has earned a score of 3 or higher on an Advanced Placement Examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of 4 or 5 the award of credit will be made automatically upon matriculation; for those presenting scores of 3 it will be determined with the approval of the University department concerned, no earlier than the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

TRANSFER CREDIT: Transfer credit, in which grades of C or above have been earned, is rated at two quality points per semester hour. Courses in which grades of less than C have been earned are not acceptable for transfer credit.

Credit for work completed at other institutions will be determined in relation to the curriculum requirements of the college in which the student enrolls at Duke.

Credit for courses in science or language offered for advanced standing in any of the undergraduate colleges by a transfer from a junior college will be determined by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is

given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses.

STUDY ABROAD: A student contemplating study abroad should be guided by the following provisions established by the Undergraduate Faculty Council and administered by the Committee on Study Abroad.

The student should

(a) have a scholastic average of at least 2.5 (recommended);
(b) obtain prior permission to study abroad from major adviser and academic dean;
(c) receive certification from the foreign language department concerned that he can handle adequately the language of the country where he will study, provided that the language be taught at the freshman-sophomore level at Duke;
(d) obtain in advance, wherever possible, approval of his program of studies from major adviser and academic dean.

If the student wishes to transfer credit to Duke and

(a) is participating in a program sponsored by an American group, the group must have been approved by the above committee and the program he proposes must meet the qualifications of the sponsoring group

or (b) studies abroad under his own sponsorship, work to be considered for transfer must be done in the language in which courses are normally given in the institutions attended.

INDEPENDENT STUDY: Students who have a 3.0 quality point ratio overall and in their major may be permitted to enroll for independent study during their junior and senior years. The courses, numbered 191, 192 and 193, 194, are designed to permit students to pursue individual research and reading in a field of special interest. The student will pursue an extensive program of independent reading, subject to the supervision of a member of the staff. A student need not be in a Graduation with Distinction program to enroll in independent study courses. The maximum credit allowed for independent study and honors research courses is 3 semester hours per semester during the junior year and 6 semester hours per semester during the senior year. Interested students should consult the Director of Undergraduate Studies in the department in which they wish to work.

## *Academic Honors*

DEAN'S LIST: In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's

work of not less than the minimum academic load are placed on the Dean's List.

CLASS SCHOLARS: The five students in each combined undergraduate class of the University (including Trinity College, The Woman's College, and the College of Engineering) who achieve the highest quality point ratio on at least a normal course load for each academic year shall be designated Class Scholars.

CLASS HONORS: To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which he is registered. All semester hours on which a student receives a grade are counted in the determination of Class Honors. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio are eligible for Class Honors.

GRADUATION HONORS: To be eligible for consideration for Graduation Honors at graduation a student must have completed in residence a minimum of ninety semester hours. Students who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude.* Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude.*

GRADUATION WITH DISTINCTION: At the beginning of their junior or senior year, students of superior ability may be selected by their major department to enter a special program. Those among the selected candidates that demonstrate, to their department and a committee of the faculty, exceptional achievement in the area of their special interest will be Graduated with Distinction. (Students who participate in the program must complete a minimum of 18 semester hours above the introductory courses in their major in addition to the credit received from courses directly related to the Graduation with Distinction program.)

HONORS-MASTERS PROGRAM: This program, which is made possible partly by a grant from the Ford Foundation's Fund for the Advancement of Education, aims at the recruitment and accelerated preparation of college and university teachers. Academically superior undergraduates are selected by the Honors-Masters Committee during the spring of their sophomore year. During the junior year, these pregraduates are enrolled in Colloquium 101, 102; normally the pregraduates will be candidates for graduation with distinction in their major departments. Emphasis is also placed on the acquisition of reading knowledge of two satisfactory foreign languages prior to the beginning of graduate work. Summer school scholarships as well as a limited number of first-year graduate scholarships are available.

# Other Regulations

CONDUCT AND DISCIPLINE: The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of scholarship. General University regulations concerning conduct of students will be made available to students when admission is offered, or upon request. The student in accepting admission indicates his willingness to subscribe to those regulations. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of the Vice-President in the Division of Student Life. Immediate supervision is entrusted to the Dean of Men and the Dean of Women. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morality and honor, the student body has become to a great degree self-governing. Two councils, one of men and the other of women, each composed of duly elected representatives of the student body, exercise the authority granted the students by their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to make recommendations of penalties based on their findings. They exert a guiding and stimulating influence for the promotion of high ideals of conduct and of student relationships.

MOTOR VEHICLES: Freshmen are not permitted to own or operate motor vehicles at the University. In accordance with University regulations members of the upper classes of Trinity College and the College of Engineering and seniors in the Woman's College may operate motor vehicles.

Students permitted to operate motor vehicles must register them annually at the beginning of the fall semester, or if the vehicle is acquired later, within five days after bringing it to the campus. Students must show a state vehicle registration and a state operator's license. A standard certificate of automobile liability insurance, issued by a recognized company and evidencing coverage of at least $5,000 per person and $10,000 per accident for personal injury and $5,000 for property damage is also required. There is a registration fee of $30.00 per vehicle for each academic year.

Students under 21 years of age must have the written consent of parent or guardian before operating a motor vehicle at Duke.

SCHOLASTIC REGULATIONS FOR PARTICIPATION IN ATHLETICS AND OTHER ACTIVITIES: Members of athletic teams or other student groups engaging in public representation of the University are expected to be carrying their current work satisfactorily. Students may be barred from participation in such representation if, in the opinion of the dean of their college, they fail to meet this requirement.

ENROLLMENT AND REGISTRATION: Students in residence are required to submit, not later than the date of the spring registration, cards showing their selection of courses for the following year. Evidence of the payment of the continuing pre-registration deposit of $25.00 (see page 20 for detailed information) is required before the card may be submitted. These cards are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the appointed time must be readmitted to the college by application to the Director of Admissions. Each student planning to continue enrollment for the following year must apply for a room or obtain permission to live off campus prior to the end of the spring semester. Students whose course cards have been approved in the spring may enroll by mail during the summer. The same regulations, with the exception of the advanced deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that prescribed in the Calendar of the Colleges must pay to the Treasurer a fee of $5.00. (See attendance regulations, page 34.) Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

READMISSION OF FORMER STUDENTS: A student who desires to return, following withdrawal from college, should apply to the Director of Admissions, and send a detailed statement of his activities since withdrawal.

TRANSCRIPTS: Requests for transcripts should be directed to the Office of the Registrar. Ten days should be allowed for processing. One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

# Requirements for Degrees

DUKE UNIVERSITY offers in Trinity College, the Woman's College, and the College of Engineering, courses of study which lead to the degrees of: Bachelor of Arts; Bachelor of Science; and Bachelor of Science in Civil, Electrical, or Mechanical Engineering.

## *Bachelor of Arts*

The requirements for the degree of Bachelor of Arts are based on the principle that the student will derive the maximum benefit from his college work if his program includes a broad distribution of studies among representative fields of culture, concentration within a special field, and some work of his own choice.

For graduation with the degree of Bachelor of Arts, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

| Uniform Course Requirements | s.h. |
|---|---|
| English | 6 |
| Foreign Language | 6–18 |
| Natural Science | 8 |
| Formal Science | 3 |
| Religion | 6 |
| Social Science and History | 12 |
| Humanities | 12 |
| Physical Education | 4 |
| Major and Related Work | 42 |
| Electives to Make a Total of | 124 |

These requirements are described in detail below.

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

FOREIGN LANGUAGE.—The languages which meet this requirement are French, German, Greek, Latin, Russian, and Spanish. This requirement is fulfilled by one of the following: 1.) a passing grade in French 64, German 92 or equivalent, Greek 106 or 108, Latin 92, Russian 64 or Spanish 64; 2.) a satisfactory score on the placement test, plus a validating year (two literature courses numbered 90 or above); 3.) passing a proficiency examination. (The proficiency examination can be taken only by students who have been enrolled in language work in the University and is not available to entering Freshmen.) Students presenting for entrance four units of Latin may satisfy the language requirements by the completion of the third college year of Latin or two years of Greek.

Students enrolled during the fall of 1962 in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 bulletin.

NATURAL SCIENCE, 8 s.h.—To satisfy this requirement a student must complete a laboratory course in one of the natural sciences (botany, chemistry, geology, physics, or zoology).

FORMAL SCIENCE, 3 s.h.—One course of at least 3 semester hours selected from mathematics (except mathematics 11), logic and scientific methodology (Philosophy 48, 103 and 104).

RELIGION, 6 s.h.—This requirement may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

SOCIAL SCIENCE AND HISTORY, 12 s.h.—To satisfy this requirement a student must complete 12 semester hours in two departments from the following basic courses: Economics 51-52; Education 54-104; History 1-2, or 51-52; Political Science 11-12, or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

HUMANITIES, 12 s.h.—To satisfy this requirement a student must complete 12 semester hours from the following courses, with six hours in each of two divisions: (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

I. Literature: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation.
II. Philosophy 41-42, 93-94.
III. Art and Music: Art 1-2, 51-52; Music 1-2, 51-52.

PHYSICAL EDUCATION, 4 s.h.—Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

MAJOR IN RELATED WORK, 42 s.h.—Prior to registration in the spring of his sophomore year, each student is required to choose his major field and confer with his departmental adviser about the requirements for major and related work.

The major work consists of 18 to 24 semester hours in one department above the introductory courses. Introductory courses consist of two one-semester courses in all departments except the departments of Economics and Business Administration, German, Latin, Music, and Romance Languages, in which the introductory courses may consist of four one-semester courses. The choice of courses must be approved by the major department. Whenever the department defines the major as 24 hours above the introductory courses, the student, with the prior approval of the Director of Undergraduate Studies, may substitute 6 hours of advanced work normally taken by a major in a related discipline during his junior or senior year. Eighteen hours of related work must be taken in at least two other departments and is selected subject to the approval of the major department and the dean of the appropriate college; it may not include more than one course of 6 or 8 semester hours open primarily to freshmen. With the consent of the department, however, majors in mathematics, the natural sciences, and science education may include as related work introductory courses in mathematics and the natural sciences. Although courses satisfying the uniform course requirements may also be counted toward the requirements in major and related work, no student may satisfy two uniform course requirements with the same course.

ELECTIVES.—In addition to the uniform courses required and the major and related work, other courses must be completed to make a total of at least 124 semester hours, including 4 semester hours of physical education.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the dean of the appropriate college.

## CHOICE OF A MAJOR FIELD

The requirement of 42 semester hours distributed, as specified above, between a major field and related work is based primarily on the belief that some advanced study in one subject, together with work in allied subjects is a valuable part of a general education. The

selection of a major field usually depends on a student's cultural or vocational interests.

## GENERAL PROGRAM

The General Program is designed for the student whose primary interest is in one of the liberal arts subjects. The subjects in which major work is offered are: art, botany, chemistry, economics, education, English, French, geology, German, Greek, history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, Russian, sociology, Spanish, zoology.

## SPECIALIZED PROGRAMS

A student who has chosen a particular field may wish to take more course work in a major or related discipline than is required by his major department. The following programs of study offer a guide in planning this work, especially as it applies to preparation for various professions or professional schools.

### UNDERGRADUATE PROGRAMS

ACCOUNTING: A student may specialize in public or industrial accounting in his Junior and Senior years. In either case the same courses should be taken in the Freshman and Sophomore years.

Freshman Year: Mathematics 17 or 21.
Sophomore Year: Economics 51-52,
Economics 57, 58, and Economics 138.

### *Public Accounting*

The following sequence of courses includes more than the requirement for a major in accounting. It lists, however, the courses needed to meet the current requirements of the North Carolina Board of Certified Public Accountants.

| *Junior Year* | *Senior Year* |
|---|---|
| Ec. 143—Corporation Finance | Ec. 273—Auditing Theory and Practice |
| Ec. 149—The Theory of the Firm | Ec. 274—Advanced Auditing |
| Ec. 153—Money and Banking | Ec. 275, 276—Advanced Industrial |
| or Ec. 154—Aggregative Economics | Accounting and Management |
| Ec. 171—Accounting Theory | Ec. 277—Income Tax Accounting |
| Ec. 172—Corporate Accounts | Ec. 295—Advanced Acctg. Seminar-Theo. |
| Ec. 181—Business Law | Ec. 296—Advanced Acctg. Seminar-Pract. |

Election of one of the following:

Ec. 144—Investments
Ec. 178—Accounting Systems
Ec. 182—Business Law
Ec. 189—Business and Government
Ec. 249—Product Markets

### *Industrial Accounting*

| *Junior Year* | *Senior Year* |
|---|---|
| Ec. 143—Corporation Finance | Ec. 153—Money and Banking |
| Ec. 149—The Theory of the Firm | or Ec. 154—Aggregative Economics |

Ec. 171—Accounting Theory
Ec. 172—Corporate Accounts
Ec. 189—Business and Government
Ec. 273—Auditing Theory and Practice
Ec. 275, 276—Advanced Industrial Accounting and Management
Ec. 277—Income Tax Accounting
Ec. 279—Budgeting and Control
Ec. 190—The Use of Quantitative Methods in Business
Ec. 291—Business Policy

BUSINESS: A specialized program is offered for students planning to enter business. A student electing this program must take, in addition to the uniform course requirements, the following courses in the sequence indicated.

| | |
|---|---|
| Freshman Year: | Mathematics 17 or 21 |
| Sophomore Year: | Economics 51-52, Economics 57, 58, and Economics 138. |
| Junior Year: | Economics 143 and Economics 149. |
| | Economics 153 and Economics 154. |
| Senior Year: | Economics 249, Economics 185 or 190, and Economics 291. |

MUSIC EDUCATION: The following course sequence is designed for prospective teachers of high school instrumental or vocal music. Although it includes more than the number of hours required for a major in music, it represents those courses recommended by the Music Department for state certification: Music 51-52, 65-66, 115-116, 121-122, 147-148, 3 additional semester hours in Music Literature, and 18 semester hours in Applied Music.

Other areas of concentration in music are described on pages 99-104 of this *Bulletin*.

TEACHING: Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers.

The program for students who intend to teach is designed to prepare for positions either in elementary or secondary schools. All prospective teachers must take Psychology 91, preferably during the sophomore year, and Education 100 preferably during the junior year. Only students with an average of 2.0 overall and in their major or teaching fields will be admitted to student teaching. Special methods courses should be taken prior to undergraduate student teaching, which may be done *only* in the senior year.

Whatever their majors, students should consult an appropriate member of the Department of Education prior to each registration period to assure their meeting the certification requirements of the states in which they wish to teach and having places reserved for them in student teaching.

*Elementary-School Teaching.* Students preparing to teach in the elementary school must complete the following specific requirements in addition to Psychology 91 and Education 100 or 113: Education 101, 102, 105, 106, 107, 108, 118, and 161; Economics 115 or 120; History 91, 92; Music 151, 152; Health Education 134, and Physical Education 102.

*Secondary-School Teaching.* Students preparing to teach in a secondary school may meet certification requirements by qualifying in one teaching subject, but they are strongly advised to choose courses that meet requirements in two teaching subjects. Prospective secondary-school teachers must major in a subject other than education.

*Science Education Major.* Students who intend to teach sciences in the high school may major in Science Education. The program is designed to meet certification requirements and to provide the broad background of preparation in the sciences which is needed by science teachers. Students planning to enter this program should consult an adviser in the Department of Education and in one of the science departments. The basic requirements are: Education 100, 118, 215, 216, and 276 or 246; Mathematics 21 and 22; Sciences (botany, chemistry, geology, physics, and zoology) and mathematics above 22; 36-40 s.h. (Courses must be taken in at least two science departments, 12 s.h. above the introductory level.)

### PREPARATION FOR GRADUATE AND PROFESSIONAL SCHOOLS

Many graduate and professional schools require special tests for students seeking admissions. Information regarding the test requirements should be obtained from the catalogue of the schools to which the student plans to apply. The Bureau of Testing and Guidance has available applications for required graduate and professional testing programs.

GRADUATE SCHOOL: The student who plans to enter a graduate school of arts and sciences for advanced study should consult an adviser in the field of the proposed advanced study concerning suitable preparation. Most graduate schools have definite requirements in foreign languages for all students. Candidates for the degree of Doctor of Philosophy are required to pass reading examinations, usually in German and French. In some cases other languages may be substituted. As soon as practicable, the student should ascertain the requirements of the particular graduate school he desires to enter.

LAW SCHOOL: Students who plan to prepare for Law School may select their major work in any field. The following courses are recommended:

Economics 51-52, 57, 58.
English 55-56.
History 1-2 or 51-52, 105-106.
Philosophy 48 and 41.
Political Science 61-62.
Sociology 91-92.

MEDICAL AND DENTAL SCHOOLS: Students planning to enter a medical or dental school should arrange their programs of study from the first semester so as to include those courses required by the profession-

al schools of their choice. These courses usually include two years of English, two years of chemistry, and one year each of biology, mathematics, and physics. At Duke University the courses normally taken are English 1-2 and 55-56, Chemistry 1, 2, 61, 151, and 152, Zoology 1 and 2, Mathematics 21-22, and Physics 41-42. Most professional schools require ninety semester hours of college credit before consideration for admission. Because individual medical and dental schools strongly recommend, or, in some cases, require specific courses in addition to those listed above, it is wise for the student to be fully aware of any additional requirements established by the professional school of his choice.

The minimum uniform course requirements and those of the major and its related work for either the A.B. or B.S. degree must be fulfilled for graduation. The latter requirements are described for each department under Courses of Instruction in this *Bulletin*. Each student may elect to major in the department of his choice, but should understand that even with careful program planning starting his first semester, it may be necessary to exceed the 124 semester hours required for graduation.

The pre-professional student usually registers for the following program during his first year:

English 1-2.
Mathematics 21-22.
*Two laboratory sciences.
†Uniform requirement.
Physical Education 1-2.

Theological Schools and Religious Work: A student who plans to enter the ministry or follow some other professional Christian vocation should have a broad liberal arts background. Recommended majors are English, history, philosophy, religion, and sociology. It is desirable that the student include the following in his program:

English: 12-18 s.h. (including English 55, 56).
History: 6-12 s.h.
Philosophy: 6-12 s.h. (including Philosophy 93, 94).
Psychology: 12-18 s.h.
Social Sciences (other than history): 6-12 s.h.

These suggestions are in harmony with the recommendations of the American Association of Theological Schools for undergraduate courses of study.

* The student planning to enter medical or dental school who elects only one laboratory science should begin the foreign language sequence the first year.

† Programs of the first two years should normally be completed with courses which fulfill minimum uniform requirements. Electives are limited and should be postponed until late in the program.

# *Bachelor of Science*

For graduation with the degree of Bachelor of Science, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

| UNIFORM COURSE REQUIREMENTS | S.H. |
|---|---|
| English | 6 |
| Foreign Language | 8–24 |
| Mathematics | 6 |
| Natural Science | 8 |
| Social Science and History | 6 |
| Religion | 6 |
| Humanities | 6 |
| Physical Education | 4 |
| MAJOR AND RELATED WORK | 48 |
| ELECTIVES TO MAKE A TOTAL OF | 124 |

These requirements are described below.

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

FOREIGN LANGUAGE.—Bachelor of Science candidates must complete the second college year, or equivalent as determined by examination, of one foreign language, and the first college year of another. The languages submitted will be determined by the major department. Students enrolled, during the fall of 1962, in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 *Bulletin*.

MATHEMATICS, 6 s.h.—This requirement may be met by completion of Mathematics 21 and 22.

NATURAL SCIENCE, 8 s.h.—This requirement can be satisfied by courses in one of the natural sciences, namely, botany, chemistry, geology, physics, and zoology. The courses must include laboratory work.

SOCIAL SCIENCES AND HISTORY, 6 s.h.—This requirement can be satisfied by either of the following 6-hour sequences; Economics 51-52; Education 54-104; History 1-2, or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

RELIGION, 6 s.h.—This requirement may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

HUMANITIES, 6 s.h.—This requirement can be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music, 1-2, 51-52. (Double numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

PHYSICAL EDUCATION, 4 s.h.—Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

MAJOR AND RELATED WORK, 48 s.h.—Major and related work consists of at least 48 semester hours in the natural sciences. This work must be selected from the departments of botany, chemistry, geology, mathematics, physics, psychology, and zoology. The major work consists of a minimum of 18 semester hours in one department above the introductory courses. The choice of courses is subject to the approval of the department. Whenever the department defines the major as 24 hours or more above the introductory courses, the student, with the prior approval of the director of undergraduate studies, may substitute 6 hours of ad-

vanced work normally taken by a major in a related discipline during his junior or senior year. The related work is taken in at least two other departments and is selected subject to the approval of the major department. With the consent of the department, majors in mathematics and the natural sciences may include as related work introductory courses in mathematics, the natural sciences, and science education. A minimum of 14 semester hours of related work is required, 8 hours of which must be in laboratory science. Although courses fulfilling the uniform course requirements may also be counted toward the requirements in major and related work, no student may satisfy two uniform course requirements with the same course.

ELECTIVES.—In addition to the above, the student must elect sufficient courses to complete the 124 semester hours necessary for graduation.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the dean of the college.

On or before the date announced for the spring registration, every sophomore in this group should select his major department in the natural sciences and arrange, under the guidance of an adviser in the major department, his program of studies for the following year. He should obtain the adviser's written approval of all courses selected in the division before submitting his program to the dean for final action. In like manner, each upperclassman will recheck the courses in his division of concentration each year with a representative of his major department.

## *Bachelor of Science in Civil, Electrical, or Mechanical Engineering*

The College of Engineering offers fully accredited four-year programs in civil, electrical, and mechanical engineering leading to the degrees of B.S. in C.E., B.S. in E.E., or B.S. in M.E.

In addition to the standard four-year program, to make it possible for some students to combine with their professional engineering training an enlarged program of humanities and social studies, the College of Engineering has developed a special plan of cooperation with selected liberal arts colleges. Under this "three-two" plan an outstanding student may follow an approved program of study at the cooperating liberal arts college for an initial period of three years and then come to Duke University to complete his studies at the College of Engineering in two more years. Upon completion of the combined program of five years, a degree is granted by the cooperating liberal arts college, and a degree of Bachelor of Science in the appropriate branch of engineering by the College of Engineering. Inquiries concerning this plan should be addressed to the Dean, College of Engineering, Duke University, Durham, North Carolina, 27706.

# GROUPS OF STUDIES FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL, ELECTRICAL, OR MECHANICAL ENGINEERING

## §*Uniform Freshman Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Engrg | 1 | Engineering Graphics | 2 | Engrg | 2 | Descriptive Geometry | 2 |
| Engl | 1 | English Composition | 3 | Engl | 2 | English Composition | 3 |
| Hist | 1 | Modern History | 3 | Hist | 2 | Modern History | 3 |
| Math | 21 | Introductory Calculus | 3 | †Math | 22 | Introductory Calculus | 3 |
| Phys | 41 | General Physics | 4 | Phys | 42 | General Physics | 4 |
| PE | | Physical Education | 1 | PE | | Physical Education | 1 |
| | | | *16 | | | | *16 |

## CIVIL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| Chem | 1 | Gen. Inorg. Chemistry | 4 | Chem | 2 | Gen. Inorg. Chemistry | 4 |
| †CE | 61 | Surveying | 5 | CE | 72 | Materials Laboratory I | 1 |
| Engrg | 57 | Statics | 3 | †Engrg | 107 | Mechanics of Materials | 3 |
| Math | 63 | Intermediate Calculus | 3 | Engrg | 109 | Materials Laboratory | 1 |
| ‡Approved Elective | | | 3 | Engl | 93 | Technical Communication | 3 |
| PE | | Physical Education | 1 | Math | 64 | Intermediate Calculus | 3 |
| | | | 19 | ‡Approved Elective | | | 3 |
| | | | | PE | | Physical Education | 1 |
| | | | | | | | 19 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 101 | Materials Lab. II | 1 | CE | 113 | Route Surveying | 2 |
| CE | 118 | Engrg. Materials | 2 | CE | 133 | Reinforced Concrete | 3 |
| †CE | 131 | Structural Mech. I | 3 | EE | 123 | EE Fundamentals | 3 |
| CE | 135 | Soil Mechanics | 2 | EE | 125 | EE Fundamentals Lab. | 1 |
| Engrg | 115 | Dynamics | 3 | †Engrg | 128 | Fluid Mechanics | 3 |
| ME | 103 | Thermodynamics | 3 | ‡Approved Electives | | | 6 |
| ME | 116 | ME Laboratory | 1 | | | | 18 |
| ‡Approved Elective | | | 3 | | | | |
| | | | 18 | | | | |

### *Senior Year*

| FIRST SEMESTER | | | S.H. | SECOND SEMESTER | | | S.H. |
|---|---|---|---|---|---|---|---|
| CE | 123 | Hydraulic Engrg. | 3 | CE | 116 | Transporation Engrg. | 3 |
| CE | 124 | Sanitary Engrg. | 3 | CE | 140 | Structural Mechanics II | 3 |
| CE | 132 | Structural Design | 4 | CE | | Elective | 3 |
| CE | 146 | Professional Engrg. | 2 | ‡Approved Electives | | | 9 |
| ‡Approved Electives | | | 6 | | | | 18 |
| | | | 18 | | | | |

§There is a single, common program in the Freshman Year; final choice of a department is not made until the time of registration for the sophomore year.

†Courses which must be passed before engineering academic standing can be advanced.

*Freshman engineering students taking Air Science or Naval Science will schedule certain courses in addition to the 16 semester hours prescribed for each semester.

‡Part of a program of 30 semester hours of electives planned with departmental approval to suit the interests and abilities of each student. The program will include three semester hours of mathematics beyond calculus; an additional nine semester hours in mathematics, the sciences, or other technical subjects; and another 15 semester hours in the humanities or the social sciences, including six semester hours of either economics or political science.

A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

## ELECTRICAL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 1 | Gen. Inorg. Chemistry | 4 |
| Econ | 51 | Principles of Economics | 3 |
| EE | 53 | E. E. Fundamentals | 1 |
| EE | 55 | Electric Networks I | 4 |
| Engl | 93 | Technical Communication | 3 |
| Math | 63 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 2 | Gen. Inorg. Chemistry | 4 |
| Econ | 52 | Principles of Economics | 3 |
| †EE | 56 | Electric Networks II | 4 |
| Engrg | 60 | Engineering Mechanics | 4 |
| Math | 64 | Intermediate Calculus | 3 |
| PE | | Physical Education | 1 |
| | | | 19 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 109 | Electromagnetic Systems | 4 |
| EE | 111 | Electrical Prin. Lab. | 2 |
| Engrg | 107 | Mechanics of Materials | 3 |
| Math | 111 | Applied Math Analysis I | 3 |
| Phys | 161 | Modern Physics | 3 |
| ‡Approved Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| †EE | 110 | Electromagnetic Systems | 4 |
| EE | 112 | Electrical Prin. Lab. | 1 |
| Engrg | 128 | Fluid Mechanics | 3 |
| Math | 112 | Applied Math Analysis II | 3 |
| ME | 103 | Thermodynamics | 3 |
| ME | 116 | M. E. Laboratory | 1 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

### *Senior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 165 | Seminar | 1 |
| EE | 181 | Electronic Networks | 3 |
| EE | 183 | Electronics Laboratory | 1 |
| EE | 191 | Electric Machinery | 3 |
| EE | 193 | Energy Conversion Lab. | 1 |
| ‡EE Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

| SECOND SEMESTER | | | S.H |
|---|---|---|---|
| EE | 166 | Seminar | 1 |
| EE | 182 | Electronic Networks | 3 |
| EE | 184 | Electronics Laboratory | 1 |
| EE | 192 | Electric Machinery | 3 |
| EE | 194 | Energy Conversion Lab. | 1 |
| ‡Approved Elective | | | 3 |
| ‡Approved Elective | | | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 18 |

†Courses which must be passed before engineering academic standing can be advanced.

‡Part of a planned program of electives to be chosen in consultation with the adviser. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the mimimum program.

## MECHANICAL ENGINEERING

### *Sophomore Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 1 | General Inorg. Chem. | 4 |
| Engrg | 60 | Engineering Mechanics | 4 |
| Math | 63 | Intermediate Calculus | 3 |
| ME | 52 | Kinematics Kinetics | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| PE | | Physical Education | 1 |
| | | | 18 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| Chem | 2 | General Inorg. Chem | 4 |
| Engrg | 107 | Mechanics of Materials | 3 |
| Engrg | 109 | Materials Laboratory | 1 |
| †Math | 64 | Intermediate Calculus | 3 |
| ME | 105 | Dynamics of Fluids | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| PE | | Physical Education | 1 |
| | | | 18 |

### *Junior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 123 | Fundamentals of E. E | 3 |
| EE | 125 | Elec. Fundamentals Lab. | 1 |
| Math | 111 | Applied Math. Analysis I | 3 |
| ME | 101 | Thermodynamics | 3 |
| †ME | 106 | Heat Transfer | 3 |
| ME | 141 | Machine Design | 3 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 19 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| EE | 124 | Industrial E. E | 3 |
| EE | 126 | Industrial Elec. Lab | 1 |
| Engl | 93 | Technical Communication | 3 |
| Math | 112 | Applied Math. Analysis II | 3 |
| †ME | 102 | Thermodynamics | 3 |
| ME | 114 | M. E. Laboratory | 2 |
| †ME | 142 | Machine Design | 3 |
| | | | 18 |

### *Senior Year*

| FIRST SEMESTER | | | S.H. |
|---|---|---|---|
| Econ | 51 | Principles of Economics | 3 |
| ME | 59 | Materials and Processes | 3 |
| ME | 159 | M. E. Laboratory | 1 |
| ME | 171 | Response of Phys. Systems | 3 |
| ME | 173 | Seminar | 1 |
| ME | | Elective | 3 |
| ‡Approved Electives | | | 6 |
| | | | 20 |

| SECOND SEMESTER | | | S.H. |
|---|---|---|---|
| ME | 156 | Combustion Engines | 3 |
| ME | 160 | M.E. Laboratory | 1 |
| ME | 162 | Power Plants | 3 |
| ME | 174 | Seminar | 1 |
| ‡Approved Electives | | | 6 |
| ‡Humanities-Social Studies Elective | | | 3 |
| | | | 17 |

†Courses which must be passed before engineering academic standing can be advanced.

‡The electives form a planned program to be chosen in consultation with the adviser. A maximum of nine semester hours of junior and senior level Air Science or Naval Science course work may be counted as "Approved Electives" in satisfying the minimum requirements for a baccalaureate degree in engineering. All other credits earned in Air Science and Naval Science are taken in addition to the minimum program.

## *Academic-Professional Courses*

The provision whereby a senior may elect the work of the first year in a professional school of the University shall apply solely to eligible students in Trinity College or the Woman's College. The privilege of completing a combined course for the degree is conditioned upon admission to the professional school at the close of the junior year. A student thus admitted registers as a senior in college and as first-year student in the professional school.

## ACADEMIC-FORESTRY COMBINATION

Pre-professional training in forestry is offered to students of Trinity College who are planning careers in professional forestry. A student who has completed the 3-year program of students in the liberal arts and sciences outlined below, and who has earned an average grade of C or higher (exclusive of physical education) may, with the approval of the Deans of Trinity College and the School of Forestry, respectively, transfer to the School of Forestry. Upon the satisfactory completion of the forestry course requirements in the Summer Session, and those required in the first year in the School of Forestry (see *Bulletin of the School of Forestry*) the student will be eligible for the degree Bachelor of Science from Trinity College, Duke University.

The professional degree of Master of Forestry may be earned upon satisfactory completion of the work of the second year in the School of Forestry.

Students wishing information concerning admission to the School of Forestry are invited to consult with the Chairman of the Committee on Admissions of that school.

The program of studies in preparation for admission to the School of Forestry under this combination program includes the following:

| | S.H. |
|---|---|
| Uniform Course Requirements for the B.S. Degree | 48–66 |
| Additional Required Courses | 24–26 |
| Electives to Make a Total of | 94 |
| Summer Field Work | 12 |

*Uniform Course Requirements:* These requirements are described in the Requirements for the Bachelor of Science degree in this *Bulletin*. French, German, Russian, or Spanish may be used to fulfill the foreign language requirement. The natural science requirement is met by completion of Botany 1-2. The social science and history requirement is met by completion of Economics 51-52.

Additional Required Courses:

| | S.H. |
|---|---|
| Chemistry 1-2 | 8 |
| Engineering Drawing 1-2 | 4 |
| Geology 51 | 4 |
| Physics 1-2 | 8 |
| | 24 |

*Electives:* The electives are normally chosen from botany, chemistry, economics, mathematics, and philosophy. A minimum of 94 semester hours must be obtained, exclusive of summer field work, to meet uniform course requirements, additional required courses, and electives.

*Summer Field Work:* This work of 12 weeks, to be taken upon completion of the junior year, includes:

| | S.H. |
|---|---|
| Plane Surveying (C.E. 110) | 3 |
| Forest Surveying and Aerial Photo Interpretation (F. 150) | 3 |
| Forest Mensuration (F. 151) | 3 |
| Silvics (F. 243) | 3 |
| | 12 |

Trinity College students in this combination are encouraged to consult with the special adviser for students in Academic Forestry Combination. The name of this adviser may be obtained at the School of Forestry office.

## ACADEMIC-LAW COMBINATION

A student who has completed, with an average grade of C or higher, 96 semester hours of undergraduate work, including the uniform course requirements for the degree of Bachelor of Arts and the work of the junior year in his major and related fields, may, with the approval of the dean of the college, transfer to the Duke University School of Law and be eligible for the degree of Bachelor of Arts from Duke University upon the satisfactory completion therein of the work of the first year.

It is understood that this provision shall apply solely to eligible undergraduates who have completed three years in residence in Duke University, and that not less than the full first-year's work of the Law School will be acceptable for credit towards the bachelor degree.

No single discipline or program of study can be described as the best preparation for the study of law since there are various methods of approach to legal study.

Completion of the undergraduate work necessary to qualify for the Academic-Law Combination does not insure admission to the Duke University School of Law, nor impose any restriction whatever upon its freedom in selecting students for admission. Students wishing further information are invited to consult with the Dean of the School of Law.

# Courses of Instruction

# Trinity College and the Woman's College

NOTE: Courses primarily for freshmen are numbered from 1 to 49; those primarily for sophomores are numbered from 50 to 99; those primarily for juniors and seniors from 100 to 199; those primarily for seniors and graduates from 200 to 299. The amount of credit for each course is given in semester hours following the description of the course.

The designation of (W) or (E) indicates that the course is to be given on the West Campus or on the East Campus. Odd-numbered courses are usually offered in the fall semester; even-numbered courses in the spring semester. *For courses which will be offered in 1963-64, consult the Official Schedule of Courses available to enrolled students in the Registrar's Office.*

Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course credit may be received for either semester without special permission.

## AIR SCIENCE

PROFESSOR SCHLÖGL, LT. COLONEL, USAF, CHAIRMAN; ASSOCIATE PROFESSOR OLDHAM, MAJOR, USAF, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR WILSON, CAPTAIN, USAF

ELIGIBILITY REQUIREMENTS.—All physically qualified Freshmen who are citizens of the United States and are enrolled in Trinity College or the College of Engineering are eligible to enroll in the Air Force ROTC. Veterans and Senior Division ROTC Students may be exempted from Freshman or Sophomore courses under certain conditions. In special cases where permission has been granted, certain qualified students from the Graduate and Professional Schools may be enrolled.

DEPOSIT REQUIRED.—Each student must make a deposit of twenty dollars with the University Treasurer to insure return of all Government Property.

COURSE OF STUDY.—The course of study of AFROTC students is composed of courses in the Air Science Department and designated courses in other departments which in the opinion of the Air Force are essential to the education of an Air Force Officer. In addition to classroom instruction the Air Force requires Leadership Laboratory each semester.

### BASIC COURSES

*First Year Basic*

AS 1. LEADERSHIP LABORATORY and one course selected from the academic fields of Freshman Mathematics, Foreign Language, or Physical Sciences. STAFF

AS 2. FUNDAMENTALS OF AEROSPACE WEAPON SYSTEMS.—An introductory survey of aerospace craft and missiles, their propulsion and guidance systems:

target intelligence and electronic warfare; nuclear, chemical and biological warhead agents; defensive, strategic and tactical operations; problems, mechanics and military implications of space operations; and a survey of contemporary military thought. Leadership Laboratory is required. 2 s.h. (W) WILSON

*Second Year Basic*

AS 51. WORLD MILITARY SYSTEMS.—A comparative study of free world military forces, Communist military systems, and trends in the development and employment of military power. 2 s.h. (W) WILSON

AS 52. LEADERSHIP LABORATORY and one course selected from the academic fields of Sophomore Mathematics, Foreign Language, or Physical Sciences. STAFF

ADVANCED COURSES

All students selected to continue Air Science pursue:

*First Year Advanced*

AS 101, 102. GROWTH AND DEVELOPMENT OF AEROSPACE POWER.—A study of development of air power in the United States; mission and organization of the Defense Department; Air Force concepts, doctrine and employment; astronautics and space operations; future development of aerospace power. 6 s.h. (W) OLDHAM

AS 203. THE PROBLEM OF FLIGHT AND APPLIED AIR SCIENCES OF WEATHER AND NAVIGATION are studied. Leadership Laboratory is required. 1 s.h. (W) SCHLÖGL

POLITICAL SCIENCE 121—Elements of International Relations. 3 s.h. (W) PROCTOR

AS 204. THE AIR FORCE OFFICER AND BRIEFING FOR COMMISSIONED SERVICE. Leadership Laboratory is required. 1 s.h. (W) SCHLÖGL

ECONOMICS 152—GLOBAL GEOGRAPHY. 3 s.h. (E) LANDON

## ART

ASSOCIATE PROFESSOR MUELLER, EXECUTIVE OFFICER; ASSOCIATE PROFESSOR MARKMAN, ACTING EXECUTIVE OFFICER; ASSOCIATE PROFESSOR BRODERSON, DIRECTOR OF UNDERGRADUATE STUDIES; VISITING BENJAMIN N. DUKE PROFESSOR BIER; PROFESSORS HALL AND PATRICK; ASSOCIATE PROFESSORS JENKINS AND SUNDERLAND; VISITING ASSISTANT PROFESSOR HANNEGAN; MR. STARS.

AESTHETICS

121. THE PRINCIPLES OF ART CRITICISM.—The development of criteria for making sound critical judgments based on analyses of painting, sculpture, architecture, and design. 3 s.h. (E) PATRICK

221-222. HISTORY OF AESTHETICS.—Theories of art and beauty in the western world from antiquity to the present. Some attention will be given the development theories of aesthetics in the Far East. 6 s.h. (E) PATRICK

HISTORY OF ART

1-2. INTRODUCTION TO ART HISTORY.—An historical survey of the development of architecture, sculpture, painting, and the minor arts as material manifestations of the culture of the western world from ancient to modern times, with some reference to primitive, Oriental, and other non-western culture; the vsiual arts as a record of a whole civilization. The course will provide the student with terminology and principles necessary to formation of judgment. Open only to freshmen; others, see Art 51-52. 6 s.h. (E & W) STAFF

51-52. INTRODUCTION TO ART HISTORY.—The aims of this course are identical with those of Art 1-2; the content and method are adapted to the capacities of upperclassmen. Not open to upperclassmen who have received credit for Art 1-2. 6 s.h. (E & W) STAFF

131. ART AND ARCHAEOLOGY OF THE HELLENIC WORLD.—After a preliminary treatment of the archaeological material from the Aegean, the geometric and orientalizing periods, the course deals with the architecture, sculpture and vase paintings of ancient Greece from archaic through Hellenistic times. 3 s.h. (W) MARKMAN

132. ROMAN ART AND ARCHAEOLOGY.—The course opens with a treatment of the archaeological background for the formation of the Roman style as derived from Etruscan, Greek, and indigenous Italian sources, and then deals with the architecture, sculpture and painting from the early republic to the end of the empire in Italy, and to some extent in the provinces. 3 s.h. (W) MARKMAN

133. MEDIAEVAL ARCHITECTURE.—A survey of Christian architecture in the Near East, the Balkans, Russia, and western Europe from the beginnings of the mediaeval style in the late classical period to its disintegration in the fifteenth century. 3 s.h. (E) MISS SUNDERLAND

134. MEDIAEVAL PAINTING AND SCULPTURE.—A study of painting, including mosaics, manuscripts, stained glass, and sculpture, in western Europe from the late classical period through the fourteenth century. 3 s.h. (E) MISS SUNDERLAND

136. NORTHERN RENAISSANCE ART.—A study of book illumination, panel painting, graphic arts, and sculpture as expressions of literary, religious, and philosophical ideas of the fifteenth and sixteenth centuries in the Low Countries, Germany, and France. Some emphasis will be placed on individual artists such as the Van Eycks, Van der Weyden, Bouts, Van der Goes, Bosch, Bruegel, Grünewald, and Dürer. 3 s.h. (E) MUELLER

137. ITALIAN RENAISSANCE PAINTING AND SCULPTURE.—This course traces the evolution of painting and sculpture in Italy from the beginning of the fifteenth century through the middle of the sixteenth. Special emphasis is placed on developments in Florence, Venice, and Rome. 3 s.h. (E) MISS JENKINS

140. SEVENTEENTH CENTURY PAINTING AND SCULPTURE IN EUROPE.—This course traces the evolution of the Baroque style in European painting and sculpture with some attention being given to related manifestations in the late sixteenth and early eighteenth centuries. Particular emphasis is laid on developments in Flanders, France, Holland, and Spain. 3 s.h. (E) MISS JENKINS

141. AMERICAN ART.—A survey of architecture, sculpture, and painting in America from the time of the first settlers to the present day, including a consideration of the contributions of the English, Dutch, French, and Spanish to the artistic heritage of the United States. 3 s.h. (E) PATRICK

143. THE HISTORY OF PRINTS AND DRAWINGS.—An historical and critical study of drawings and prints from the fifteenth century to the present with reference to functions, values, and relationships to other forms such as painting, sculpture, and the book. 3 s.h. (E) MUELLER

144. RENAISSANCE AND BAROQUE ARCHITECTURE.—A study of the development of Renaissance architecture in Italy from its beginnings in the fifteenth century in the works of Brunelleschi to its flowering in the seventeenth century Baroque works of Bernini and Borromini, along with a consideration of the spread of Italian Renaissance forms to north Europe in the sixteenth century and its development into a Baroque style in the seventeenth century. 3 s.h. (E) MISS SUNDERLAND

145-146. THE RISE OF CONTEMPORARY ARCHITECTURE.—A study of the sources and evolution of the architecture of today, from the eighteenth-century conflict between Romantic Historicism and Industrialism to the work of Gropius, LeCorbusier, Wright, and their successors. Credit for a single semester will be given only to seniors electing the course during their final semester. 6 s.h. (E) MISS HALL

147. PAINTING AND SCULPTURE IN THE EIGHTEENTH AND NINETEENTH CENTURIES.—An investigation of the development of painting from the final stages of the Baroque in the eighteenth century to the period of the

impressionist movement in the last decades of the nineteenth century. 3 s.h. (E) MISS SUNDERLAND

148. MODERN PAINTING AND SCULPTURE.—The history of European painting and sculpture from 1863 to the present day. The course investigates the rise of the anti-academic movements of Impressionism and Post-Impressionism in the latter half of the nineteenth century; their outgrowth in Cubism, Expressionism, and Surrealism; and the various abstract styles of the twentieth century. Particular emphasis is placed on such artists as Manet, Renoir, Cezanne, van Gogh, Gauguin, Seurat, Matisse, Picasso, Braque, and Klee. 3 s.h. (E) PATRICK

149. PRE-COLUMBIAN ART AND ARCHAEOLOGY.—A study of the architecture, sculpture, pottery, and other arts of the indigenous civilizations in Mexico, Central America, and the Andean region of South America before the Spanish conquest. 3 s.h. (W) MARKMAN

150. LATIN AMERICAN ART.—A study of the architecture, painting, and sculpture of Latin America from colonial times to the present. Particular emphasis will be placed on architecture of the colonial period in Mexico, Peru, and Brazil. The recent developments in mural painting in Mexico and architecture in both Mexico and Brazil will also be stressed. 3 s.h. (W) MARKMAN

191, 192. INDEPENDENT STUDY.—Open to highly qualified students by permission of the department. (See page 36).

FOR SENIORS AND GRADUATES

215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—A specialized study of the development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part of Syria and Palestine, to the Persian conquest. 3 s.h. (W) MARKMAN

216. RELIGIOUS ART OF THE CLASSICAL WORLD.—A specialized study of the religious art, particularly architecture and sculpture, of Greece and Rome, with special emphasis on the monuments in the Near East. 3 s.h. (W) MARKMAN

217. AEGEAN ART.—A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 3 s.h. (W) MARKMAN

218. EARLY GREEK ART.—A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 s.h. (W) MARKMAN

233. EARLY MEDIAEVAL ARCHITECTURE.—The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 s.h. (E) MISS SUNDERLAND

234. ROMANESQUE SCULPTURE.—The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 s.h. (E) MISS SUNDERLAND

236. GOTHIC SCULPTURE.—The subject matter of this course for the spring semester of 1964 is "Tilmann Riemenschneider and the late Gothic German sculpture." This study focuses on the art of this late Gothic German sculptor whose work will be compared with that of other prominent artists of the period. 3 s.h. (E) BIER

239. ARCHITECTURE OF BRITAIN.—After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 s.h. (E) MISS HALL

240. ARCHITECTURE OF NORTH AMERICA.—A study illustrating the transplantation of European architectural customs since the sixteenth century; the time lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 s.h. (E) MISS HALL

292. RESEARCH PROBLEMS IN THE COLLECTIONS OF THE NORTH

CAROLINA MUSEUM OF ART.—A specialized study of selected art works in the collections of the North Carolina Museum of Art. Students will meet once every week in the museum in Raleigh. In completion of the course each student will submit a report on his particular research project. 3 s.h. (E) BIER

## DESIGN

*Students other than art majors may receive not more than eight semester hours credit for work in studio courses. For any number of semester hours of credit in studio courses an equal number of hours must be taken in History and Criticism. The Introductory courses 1L-2L or 51L-52L are prerequisite for all courses in Design.*

1L-2L. DESIGN LABORATORY.—This course aims to develop the student's visual faculty through practice with design elements and experience with media. Freshmen intending to elect further courses in Art are advised to carry this course concurrently with Art 1-2. Open only to freshmen enrolled in Art 1-2; others, see Art 51L-52L. 2 s.h. (E) BRODERSON

51L-52L. DESIGN LABORATORY.—The aims, content, and method of this course are similar to those of Art 1L-2L. Upperclassmen intending to elect further courses in Art are advised to carry this course concurrently with Art 51-52. Open only to upperclassmen enrolled in Art 51-52, and to those who have completed Art 1-2 or 51-52 without electing Design Laboratory. A senior in his last semester may receive credit for one semester. 2 s.h. (E) BRODERSON

53-54. BEGINNING STUDIO.—A studio course offering experiment and practice with formal elements of composition in various media. Particular emphasis will be given to drawing; watercolor, collage, and three-dimensional media will be secondarily considered. 4 s.h. (E) BRODERSON

55, 56. PAINTING.—A studio course designed to give experience in painting media with individual and group criticism, and discussion of important historic or contemporary ideas in painting as related to student work. Prerequisite: Art 53-54 or consent of the instructor. 4 s.h. (E) BRODERSON

157, 158. ADVANCED PAINTING.—Emphasis is given to the techniques of various painting and design media. Prerequisite: 55, 56. 4 s.h. (E) BRODERSON

159, 160. PRINTMAKING.—This course presupposes a knowledge of design and skill in drawing. Practice in wood engraving; block printing; and in copperplate engraving, etching, acquatint, and drypoint. Reference will be made to prints in relation to the design of the book, and historic examples of the art of the print will be analyzed in the study of these techniques. Prerequisite: 53-54. 4 s.h. (E) MUELLER

## DEPARTMENTAL MAJOR IN ART

*Prerequisite:* Introduction to Art History (1-2 or 51-52); or, with the approval of the Director of Undergraduate Studies, equivalent hours in 100 level courses which form a background for the History of Art.

*Major Requirements:* The student will select in consultation with the departmental adviser a sequence of courses emphasizing either the History of Art or Design.

*a.* History of Art: 24 semester hours from 100 and 200 level courses distributed over the entire field of Art History, and a concentration of courses in at least two areas.

*b.* Design: 22 semester hours, of which 16 must be in Design and 6 from courses in the History of Art and Theory.

*Related Work:* 18 semester hours elected from courses in aesthetics, anthropology, English, German, Greek, Latin and Roman Studies, history, history of music, history of religion, linguistics, philosophy, psychology, Romance Languages, and sociology.

The Department offers work leading to graduation with distinction. See the Section on honors in this *Bulletin*.

## BIOLOGY

See courses listed under Botany and Zoology.

## BOTANY

ASSOCIATE PROFESSOR JOHNSON, CHAIRMAN; ASSOCIATE PROFESSOR HUMM, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR CULBERSON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS ANDERSON, BILLINGS, HARRAR, KRAMER, NAYLOR, OOSTING, AND PERRY; ASSOCIATE PROFESSORS PHILPOTT AND WILBUR; ASSISTANT PROFESSORS STONE AND WHITE; AND ASSISTANTS

1. GENERAL BOTANY.—An introduction to the structure and life-processes of seed plants and the environmental factors influencing their distribution. Laboratory, discussions, and field trips. 4 s.h. (W & E) STAFF

2. GENERAL BOTANY.—An introduction to reproduction, heredity, and identification with emphasis on flowering plants; and an introduction to the microflora important in biological communities. Prerequisite: Botany 1. 4 s.h. (E & W) STAFF

52. PLANT IDENTIFICATION.—Practice in the identification of local plants and a study of the principles underlying plant classification. Laboratory, lectures, and field trips. Prerequisite: one year of botany. 4 s.h. (W) WILBUR

55. STRUCTURE OF VASCULAR PLANTS.—A detailed study of the vegetative and reproductive tissues of seed plants; and a survey of the several groups of vascular plants emphasizing relationships of body structures. Prerequisite: one year of botany. 4 s.h. (W) WHITE

101. PRINCIPLES OF HEREDITY.—The basic principles of heredity and their significance. Lectures, three hours; laboratory, two hours; conference, one hour. Laboratory work includes experimental breeding of the fruit fly. May be taken as a lecture course without laboratory. Prerequisite: one (high-school or college) course in biology, botany, or zoology. High-school algebra or one year of college mathematics recommended. 3 (without laboratory) or 4 s.h. (W) PERRY

103. GENERAL BACTERIOLOGY.—A study of the morphology and fundamental physiological processes of bacteria: their relationship to sanitation, public health, soil fertility, and food preservation. Prerequisite: one year of botany or zoology, or equivalent. 4 s.h. (W) HUMM

104. THE STRUCTURE AND IDENTIFICATION OF LOWER PLANTS.—A study of representative examples of algae, fungi, mosses and liverworts, including collection, identification, and classification of common forms. Offered in alternate years. Prerequisite: one year of botany. 4 s.h. (W) ANDERSON

151. INTRODUCTORY PLANT PHYSIOLOGY.—The principal physiological processes of plants, including water relations, synthesis and use of foods, and growth phenomena. Prerequisite: Botany 1, 2 or equivalent; one year of chemistry recommended. 4 s.h. (W) KRAMER

156. PLANT ECOLOGY.—Principles of the relationships between plants and their environment. The structure and processes of typical ecosystems. Laboratory, lectures, and field trips. Prerequisites: Botany 1, 2 and 52, or equivalent. 4 s.h. (W) BILLINGS

202. GENETICS.—The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. Offered in alternate years. Prerequisites: one year of botany or zoology, or equivalent, and one year of college mathematics. 4 s.h. (W) PERRY

203. PLANT CYTOLOGY.—A study of the structure and organization of plant cells in relation to growth, reproduction and especially heredity. Offered jointly with zoology. Prerequisite: one year of botany. 4 s.h. (W) ANDERSON

204. ANATOMY AND MORPHOLOGY OF VASCULAR PLANTS.—A study of vegetative and reproductive tissues of vascular plants including selection and prepa-

ration of fresh plant materials. An analysis of some of the significant literature bearing upon function, development, ecology, and phylogeny. Prerequisite: Botany 55 or equivalent. 4 s.h. (w) WHITE

221. INTRODUCTORY MYCOLOGY.—Field and laboratory study of the vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: One year of biological science. 4 s.h. (w) JOHNSON

225-226. SPECIAL PROBLEMS.—Students with adequate training may do special work in the following fields:

1. MYCOLOGY AND PLANT PATHOLOGY. JOHNSON
2. CYTOLOGY. ANDERSON
3. ECOLOGY. OOSTING AND BILLINGS
4. GENETICS. PERRY
5. MORPHOLOGY AND ANATOMY OF HIGHER GROUPS. PHILPOTT AND WHITE
6. MORPHOLOGY AND TAXONOMY OF LOWER GROUPS. ANDERSON, HUMM AND CULBERSON
7. PHYSIOLOGY. KRAMER AND NAYLOR
8. TAXONOMY OF HIGHER GROUPS. WILBUR
9. MICROBIOLOGY. HUMM
10. EXPERIMENTAL TAXONOMY AND EVOLUTION. STONE

240. PLANT EVOLUTION.—Microevolutionary change and factors influencing its rate and direction, with primary emphasis on examples from the plant world. 3 s.h. (w) STONE

252. PLANT METABOLISM.—The physiochemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) NAYLOR

254. PLANT WATER RELATIONS.—A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 s.h. (w) KRAMER

255. TAXONOMY.—A study of the historical background of plant taxonomy, modern concepts and systems of classification, nomenclatorial problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 s.h. (w) WILBUR

256. COMMUNITY ANALYSIS AND CLASSIFICATION.—The development of concepts and methods in synecology leading to present applications of theory and field techniques. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) OOSTING

257. PRINCIPLES OF PLANT DISTRIBUTION.—Interpretations of floristic and ecological plant geography of world vegetation. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) BILLINGS

258. PHYSIOLOGY OF GROWTH AND DEVELOPMENT.—Consideration of the internal factors and processes leading to the production of new protoplasm and its differentiation at the cellular, tissue, and organ level in plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) NAYLOR

259. THE ENVIRONMENT.—Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) BILLINGS

260. LICHENS.—The morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 2 s.h. (w) CULBERSON

MARINE LABORATORY.—Botany 211, *Marine Algae,* and 207, *Marine Mycology,* are given alternate years at the Duke University Marine Laboratory, Beaufort, N. C. Consult the *Bulletin of the Marine Laboratory.*

### FOREST BOTANY

253. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisite: one year of botany. 3 s.h. (w) HARRAR

### DEPARTMENTAL MAJOR

*Prerequisites:* Botany 1 and 2.

*Major Requirements:* A minimum of 21 hours (B.S., 24 hours) of work including at least eight hours from each of the two following groups of courses: Group 1—Botany 52, 104 and 156; Group 2—Botany 55, 101, 103, and 151. The remaining hours may be selected from these groups and any other courses in the Department for which the student is eligible, subject to the approval of the Departmental Adviser. Forestry 257 may be counted toward a major in Botany.

*Related Work:* Courses in at least two natural science departments sufficient to total, with major work, 42 s.h. (B.S., 48 s.h.).

## CHEMISTRY

PROFESSOR SAYLOR, CHAIRMAN; PROFESSOR WILDER, DIRECTOR OF UNNDERGRADUATE STUDIES; ASSISTANT PROFESSOR BONK, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BRADSHER, BROWN, GROSS, HAUSER, HILL, HOBBS, AND KRIGBAUM; ASSOCIATE PROFESSORS POIRIER, QUIN, SMITH, AND STROBEL; ASSISTANT PROFESSORS JONES, TOREN AND WELLS; AND ASSISTANTS

1, 2. GENERAL INORGANIC CHEMISTRY.—Lectures and recitations on the elementary principles of chemistry and on the structure, properties, preparation and uses of the elements and their compounds. The laboratory work includes qualitative analysis of some of the more common metals. One lecture, two recitations, and three laboratory hours, throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. 8 s.h. (E & W) BONK, STAFF AND ASSISTANTS

42. INTRODUCTION TO CHEMICAL ANALYSIS.—An intensive study of solutions of electrolytes with special reference to chemical equilibrium. Laboratory experiments illustrate the principles of chemical equilibrium and the techniques of quantitative analysis. Credit is not given for both Chemistry 2 and 42 nor for both 42 and 61. One lecture, one recitation and six laboratory hours. Prerequisites: Permission of the Director of Undergraduate Studies, Chemistry 1, and Mathematics 21. 4 s.h. (w) WILDER AND STROBEL

61. FUNDAMENTALS OF ANALYTICAL CHEMISTRY.—A study of the reactions of electrolytes in solution and of chemical equilibrium illustrated by laboratory experiments involving the techniques of gravimetric, volumetric, chromatographic, and colorimetric analysis. One lecture, one recitation, and six laboratory hours. Prerequisites: Chemistry 1, 2 and Mathematics 21 or equivalent. 4 s.h. (w) WILDER, JONES, POIRIER, TOREN AND ASSISTANTS

65. INORGANIC CHEMISTRY.—A study of the more familiar elements and their compounds in the light of modern theories of valence and molecular structure. Three recitations. Prerequisite: Chemistry 42 or 61. 3 s.h. (w) WELLS

70. QUANTITATIVE ANALYSIS.—A study of the theory and techniques of inorganic gravimetric and volumetric analysis. One lecture, one recitation, and six laboratory hours. Not open to B.S. Chemistry majors. Prerequisite: Chemistry 42 or 61. 4 s.h. (w) TOREN, WELLS AND ASSISTANTS

132. QUANTITATIVE AND INSTRUMENTAL ANALYSIS.—Practice in advanced quantitative analysis and in the use of physical instruments in analysis with special attention to optical devices, together with a discussion of theoretical aspects. One lecture and six laboratory hours. Prerequisites: Chemistry 42 or 61 and Physics 41-42, the latter half of which may be taken concurrently. 3 s.h. (w) TOREN

151, 152. ORGANIC CHEMISTRY.—An introduction to the study of the com-

pounds of carbon in which the chemistry of aliphatic and aromatic compounds is considered. Laboratory experiments are selected to illustrate the more important reactions and preparations of organic compounds. Two lectures, one recitation, and three laboratory hours. Prerequisite: Chemistry 42 or 61. Chemistry 151 is prerequisite for 152. 8 s.h. (w) BRADSHER, MISS BROWN, QUIN, WILDER, AND ASSISTANTS

161, 162. PHYSICAL CHEMISTRY.—Fundamentals of general theoretical chemistry illustrated by selected laboratory experiments. Three recitations and three laboratory hours. Prerequisites: Chemistry 152; Physics 41-42 and Mathematics 63 or equivalent. 8 s.h. (w) HOBBS AND SMITH

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Director of Undergraduate Studies. (See page 36).

206. ELEMENTS OF THEORETICAL CHEMISTRY.—A one semester course in the general principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitation and three laboratory hours. Prerequisite: Chemistry 70, 152, Physics 41-42, and Mathematics 22. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 s.h. (w) SAYLOR AND JONES

215. ADVANCED INORGANIC CHEMISTRY.—A study of modern theories of valence and molecular structure and of inorganic compounds, particularly the less common types. Prerequisites: Chemistry 161-162 or 206. 3 s.h. (w) HILL

216. NUCLEAR CHEMISTRY.—Elementary theory of nuclear reactions, properties of isotopes, and tracer techniques. Two lectures and three laboratory hours. Prerequisites: Chemistry 70 or 132, 152 and Physics 41-42. 3 s.h. (w) HILL AND TOREN

234. CHEMICAL INSTRUMENTATION.—Discussion of physiochemical principles as applied to instrumental methods of analysis, illustrated by laboratory experiments with emphasis on methods involving electrical techniques. One lecture and three laboratory hours. Prerequisite: Chemistry 70 or 132 and either 161-162 or 206; either of the latter may be taken concurrently. 2 s.h. (w) STROBEL

251. QUALITATIVE ORGANIC ANALYSIS.—Systematic identification of organic compounds, including a study of solubilities and classification reactions. One lecture and six laboratory hours. With permission of the Director of Graduate Studies, graduate students may take three hours of laboratory work and receive 2 semester hours credit. Prerequisite: Chemistry 152. 3 s.h. (w) HAUSER

252. ADVANCED ORGANIC PREPARATIONS.—A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory exercises accompanied by discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture with lectures in alternate weeks. Prerequisite: Chemistry 152. 2 s.h. (w) MISS BROWN

253. INTERMEDIATE ORGANIC CHEMISTRY.—An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: Permission of the Director of Undergraduate Studies and 8 s.h. of organic chemistry. 3 s.h. (w) BRADSHER AND WILDER

271. INTRODUCTION TO RESEARCH.—Lectures on the use of chemical literature, research methods, recording and publication of results, and other topics. One lecture. 1 s.h. (w) MISS BROWN

275-276. RESEARCH.—The aim of this course is to give instruction in methods used in the investigation of original problems. It is open to seniors by permission of the Director of Undergraduate Studies. 1 to 3 s.h. (w) STAFF

## DEPARTMENTAL MAJOR

**A. For the degree of A.B.**

*Prerequisites:* Chemistry 1, 2, Mathematics 21, 22.

*Major Requirements:* 22 s.h., including Chemistry 61, 70, 151, 152, and an addi-

tional 6 to 8 s.h., which may be satisfied by 161-162 or 206 together with 2 or 3 s.h. selected from courses 216, 234, 251, and 252.

*Related Work:* 20 s.h., including Physics 41-42 with the remainder usually in botany, geology, mathematics, physics or zoology.

B. For the degree of B.S.

*Prerequisites:* Chemistry 1, 2 or 1, 42, Mathematics 21, 22, 63.

*Major Requirements:* Chemistry 61, 65, 132, 151, 152, 161, 162, 251, 271, 216 or 234 or 252.

*Related Work:* 18 s.h., including Physics, 11 s.h. and Mathematics 64 or 131 or 221.

The language requirements must be satisfied by German and either French or Russian.

The department offers work leading to graduation with distinction. Consult the section on Honors and Prizes in this *Bulletin*.

## CLASSICAL STUDIES

PROFESSOR ROGERS, CHAIRMAN, DIRECTOR OF UNDERGRADUATE STUDIES IN LATIN; PROFESSOR TRUESDALE, DIRECTOR OF UNDERGRADUATE STUDIES IN GREEK; PROFESSOR WILLIS; ASSISTANT PROFESSORS SETTLE AND WOMBLE; INSTRUCTORS STANLEY AND WOOLEY

### GREEK

Courses 15, 121, 122, 131, 141, 142, 151 are entirely in English and require no knowledge of the Greek language. The purpose in offering them is to give a wider circle of students some conception of the debt which modern civilization owes to the Greeks.

1-2. COURSE FOR BEGINNERS.—Open to all students. 6 s.h. (w) WOOLEY

15. MYTHOLOGY.—A study of Greek mythology and the use made of it in art and English literature. No knowledge of the Greek language is required. Open to freshmen as an elective in either semester. 3 s.h. (E & W) TRUESDALE AND WOOLEY

63-64. INTERMEDIATE GREEK.—Intensive review of fundamentals with emphasis on development of comprehensive reading ability. Selections from Herodotus, Xenophon, and Lysias. Open to students who have completed courses 1-2. 6 s.h. (w) STANLEY

105-106. HOMER.—*Iliad*, Books I-III. PLATO.—*Apology* and *Crito*. Open to students who have completed courses 1-2 and 63-64 or their equivalent. 6 s.h. (w) TRUESDALE

107-108. EURIPIDES.—*Medea*. SOPHOCLES.—*Oedipus Tyrannus*. ARISTOPHANES.—*Clouds*. Open to students who have completed the required preliminary work. 6 s.h. (w) TRUESDALE

117-118. GREEK PROSE COMPOSITION.—The character of this course is determined by the needs of the students enrolled. 3 s.h. (w) TRUESDALE

121, 122. GREEK LITERATURE IN ENGLISH TRANSLATION.—The purpose of this course is to give a general survey of the life and civilization of the Greeks, especially to those who have never studied the language but wish to become acquainted with some of the choicest portions of the literature by the use of translations. It is, however, open as an elective to all juniors and seniors, whether or not they know Greek. First, the *Iliad* and the *Odyssey* are read in translation and illustrated with stereopticon views of the excavations and discoveries at Troy and other cities of the Aegean age; then, many of the extant plays of the three great tragic poets are studied in English translation. 6 s.h. (E & W) TRUESDALE AND STANLEY

*Students may elect course 122, whether or not they have taken course 121.*

131. HISTORY OF GREECE.—The history of the Greek world from the Late Bronze Age to the Macedonian conquest. Open to seniors, juniors, and (by arrangement) sophomores. No knowledge of Greek is required. 3 s.h. (E) WOOLEY

141, 142. GREEK ART.—Open to seniors, juniors, and sophomores. A comprehensive survey of the development of Greek architecture and Greek sculpture in all periods. Course 141 is opened by a preliminary account of Egyptian, Mesopotamian, and Aegean artistic backgrounds. Course 142 is devoted chiefly to Greek art of the greatest period with the main emphasis on sculpture, and may be elected independently of course 141. All lectures are fully illustrated by slides. No knowledge of Greek is required. 6 s.h. (E) STANLEY

151. GREEK ARCHAEOLOGY.—A general treatment of the subject, with emphasis upon the value of archaeological discovery as evidence of the artistic development of the Greek people. The course includes a survey of the various archaeological sites. Open to seniors, juniors, and (by arrangement) sophomores. 3 s.h. (E) STAFF

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. See page 36.

## LATIN

Students who wish by study in English to make acquaintance with Roman antiquity from either a literary or an historical approach are afforded that opportunity through the courses in translated Latin Literature (111, 112), and Roman History (131, 132).

1-2. COURSE FOR BEGINNERS.—Forms, vocabulary, pronunciation, and syntax, with reading of easy Latin prose. The effort is made to promote rapid development of the ability to read Latin with satisfaction. 6 s.h. (E) WILLIS

63. CICERO'S ORATIONS.—Selected orations of Cicero are read with attention to prose style. Prerequisite: Latin 1-2, or equivalent. 3 s.h. (E) SETTLE AND WOOLEY

64. VERGIL'S AENEID.—Selections are read and interpreted, with due attention to prosody, and discussion of the literary excellence of the work. 3 s.h. (E) SETTLE AND WOOLEY

91. LATIN PROSE.—Selections from prose authors or Cicero's *De Senectute* and *De Amicitia,* or selected books of Livy's history, with special emphasis on developing competence in reading Latin. 3 s.h. (E) SETTLE AND STANLEY

92. LATIN POETRY.—Selections from the greatest Latin poets, especially Horace's *Odes.* 3 s.h. (E) SETTLE AND STANLEY

97. SIGHT READING IN CLASSICAL LATIN.—One period of an hour per week devoted to practice in the reading of Latin of the classical period; designed to train students to read with facility. 1 s.h. (E) WILLIS

98. SIGHT READING IN MEDIAEVAL LATIN.—One period of an hour per week devoted to reading interesting mediaeval prose and poetry. Prerequisite: at least one of the following courses: Latin 63, 64, 91, 92, and 97, or an equivalent. 1 s.h. (E) WILLIS

101. TACITUS.—Interesting and historically important selections from the *Annals* or the *Histories* of Tacitus are read, with attention to the literary style and the value of the historical narrative. 3 s.h. (E) SETTLE

102. JUVENAL.—Juvenal's literary satire forms the basis of the course. 3 s.h. (E) SETTLE

103. CICERO.—Selections from one of the major philosophical works, with attention to Cicero's philosophical thought and literary style. 3 s.h. (E) ROGERS

104. LUCRETIUS.—A study of Lucretius as a philosophical thinker and as a poetic artist. 3 s.h. (E) ROGERS

105-106. LATIN PROSE COMPOSITION.—Recommended to students who are pursuing courses 63, 64, 91, 92, and 97, and may at the discretion of the instructor be required of such students. 4 s.h. (E)

111, 112. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selective readings in Latin literature in English translation with emphasis on the drama, lyric poetry, and the varied contributions of Cicero to literature in the first term,

and upon the epic, the satire, and the novel in the second semester. (No language credit.) 6 s.h. (E) WOMBLE AND SETTLE

131, 132. HISTORY OF ROME.—A survey of the history of the Roman State from its beginnings to the death of Justinian; its expansion; development of its constitution and public administration; social, legal, political and economic problems of perennial life and interest; the background and setting of Christianity's rise and growth. (This course carries no language credit. No knowledge of Latin is required for admission.) 6 s.h. (E) ROGERS

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. See page 36.

211-212. ROMAN ORATORY.—A reading course in the history and development of Roman oratory, based for the most part on Cicero's *Brutus* and the *Dialogus* of Tacitus. 6 s.h. (E) ROGERS

### DEPARTMENTAL MAJOR IN GREEK

*Prerequisite:* Greek 1-2.

*Major Requirements:* 24 semester hours, including the following courses: Greek 63-64, 105-106, 107-108, 117-118, and 131.

*Related Work:* Eighteen semester hours, selected usually in Latin, linguistics, philosophy, art, and English.

### DEPARTMENTAL MAJOR IN LATIN

*Prerequisite:* Latin 1-2, 63-64, or equivalent.

*Major Requirements:* 24 semester hours which must include courses 91, 92, 101, 102, 103, 104, and 6 semester hours in courses at the 200-level.

*Recommended Courses:* Latin 105-106, Composition, and 131, 132, Roman History.

*Related Work:* Eighteen hours of related work, elected usually in Greek, linguistics, philosophy, art, Romance Languages, and English. Majors who contemplate graduate work are reminded of the necessity of Greek, German, and French for such study.

*Graduates of Duke University may attend the American School of Classical Studies at Athens, Greece, without charge for tuition and are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology and one in the language, literature, and history of ancient Greece, each with a stipend of $2,000. They are awarded mainly on the basis of examinations held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.*

COLLOQUIUM 101, 102.—See *Honors-Masters Program* on pages 37 and 94 of this *Bulletin.*

## COMPARATIVE LITERATURE

The courses in Comparative Literature may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major work is offered in Comparative Literature. Students interested in the study of the interrelationships of literature as a part of their undergraduate program, or as preparation for graduate work, should consult Mr. Salinger.

191, 192. INDEPENDENT STUDY.—Open only to qualified students by permission of Mr. Salinger. See p. 36. SALINGER

201, 202. ROMANTICISM.—Studies in the origin, rise and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany, with some reference to other countries. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. SALINGER

203, 204. REALISM AND SYMBOLISM.—Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy,

tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. SALINGER

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind, Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 3 s.h. SALINGER

For a description of the following courses see the departmental listing.

READINGS IN EUROPEAN LITERATURE (English 153, 154). HENINGER

MODERN EUROPEAN DRAMA (English 155) REARDON

RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE (Religion 187). WHITE

## ECONOMICS AND BUSINESS ADMINISTRATION

PROFESSOR DE VYVER, CHAIRMAN; PROFESSOR SMITH, ACTING CHAIRMAN, SECOND SEMESTER 1963-64; PROFESSOR JOERG, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BLACK, DICKENS, FERGUSON, HANNA, HOOVER, LANDON, MCGEE, SAVILLE, AND SPENGLER; ASSOCIATE PROFESSORS BLACKBURN, DAVIES, GERHARD, GOODWIN, KELLER, KREPS, SHIELDS, AND YOHE; ASSISTANT PROFESSORS DE ALESSI, ETTIN, FOLSOM, NAYLOR, AND WALLACE; INSTRUCTOR PETHIA; VISITING ASSISTANT PROFESSORS (PART-TIME) GALIFIANAKIS, AND HAHN, MRS. BIEHN, MISS MURPHY, MESSRS. BORCHERDING, AND RUTMAN

The courses offered by the Department are listed under three divisions, Economics, Accounting, and Business Administration.

In general, the Economics courses aim to develop in the student such critical and analytical skills as underlie the ability to understand economic problems and institutions, both in their contemporary and in their historical setting. While no particular vocational or professional goal is emphasized, these courses furnish the academic background necessary for many positions in industry, for work in the economic branches of government service, and for graduate study in economics and the social sciences.

Courses in Accounting and Business Administration, although more concerned with general principles than with specific applications, stress in greater measure than courses in Economics the knowledge and techniques useful to students definitely preparing for business careers. The student who majors in Accounting may elect courses in accountancy, business law, and related work, sufficient to qualify for admission to C.P.A. examinations.

Economics 1, 2 or 51-52 must be passed by all students planning to elect further courses in Economics and Business Administration.

### ECONOMICS

1. INTRODUCTION TO ECONOMIC PROBLEMS AND POLICIES.—The present-day American economy and the challenge from centrally planned economies; policies to deal with problems of depression, inflation, growth, and automation. 3 s.h. (E & W) (Open only to Freshmen.) STAFF

2. THE EVOLUTION OF ECONOMIC IDEAS.—A study of man's economic activities and his ideas about them, from the ancient world to the present day. Emphasis is given to the historical roots of important contemporary economic ideologies. 3 s.h. (E & W) (Open only to Freshmen.) STAFF

51-52. PRINCIPLES OF ECONOMICS.—First semester, Macroeconomics: Preview of American economy, national income accounting and determination of national income and output; fluctuation and growth of output, monetary and fiscal policies for stability and growth. Second semester, Microeconomics: Output, cost, and pricing of business firms under varying market conditions; distribution of national output; problems of business, labor, and agriculture; international trade and economic development. 6 s.h. (E & W) STAFF

103. TRANSPORTATION.—Essential features, problems, and competitive posi-

tions of rail, highway, air, and inland-water transportation, with most emphasis on rail transportation. Special attention is given to the economic significance of transportation, and to cost factors, rates and their economic effects and regulations. 3 s.h. (w) LANDON

132. THE ECONOMIC HISTORY OF THE UNITED STATES.—Development of economic institutions as the United States passed from a wilderness area to an industrial society. Special attention is given to measures of economic change and their application to models of economic growth and fluctuation. 3 s.h. (w) SAVILLE

149. THE THEORY OF THE FIRM.—Cost and supply considerations in price theory, the demand for factors of production. The allocation of resources is examined in the context of competitive and monopolistic market structures. 3 s.h. (w) DE ALESSI

150. ECONOMIC THOUGHT SINCE ADAM SMITH.—A course of readings in leading economic writers of the nineteenth and twentieth centuries. 3 s.h. (w) GOODWIN

152. GLOBAL GEOGRAPHY.—The subject matter involves resources patterns and world affairs, geonomic problems, geocultural problems, and geographic factors affecting geopolitical questions. 3 s.h. (E) LANDON

153. MONEY AND BANKING.—The lender's side of financial markets. The activities of commercial banks and other financial institutions in supplying loanable funds and the effects of these activities on the money supply and its rate of use, the impact of central bank and Treasury operations on financial markets, and the evolution of the present monetary system and its institutions. 3 s.h. (w) YOHE, ETTIN

154. AGGREGATIVE ECONOMICS.—Concepts and measurement of national income and expenditures, employment, and price levels; the theoretical determination of these aggregates; and applications of macro-economic theory to business cycles and economic growth. 3 s.h. (w) YOHE

155. LABOR PROBLEMS.—An examination of present-day labor problems followed by an intensive study of methods used by employers and workers in meeting those problems. 3 s.h. (w) DE VYVER; MRS. KREPS

160. THE POLITICAL ECONOMY OF EUROPE: RECENT DEVELOPMENTS.—A study of changing economic relations between European countries and of the changing position of Europe in the world economy after World War II. Selected topics of an interdisciplinary nature will be discussed by visiting lecturers. (w) GERHARD

161. EUROPEAN ECONOMIC PROBLEMS.—An application of the theory of international economics to the problems of international economic integration with emphasis on the European Common Market. 3 s.h. (w) GERHARD

169. ECONOMICS OF CONSUMPTION.—Economic problems of the family. Factors determining choice; commercial and legal standards for consumer's goods; consumer credit and co-operation; income and standards of living. 3 s.h. (w) MRS. KREPS

189. BUSINESS AND GOVERNMENT.—A survey of the public policies which most directly affect the operation of competition in the business world. The course considers the leading philosophies of public control and economic development, the validity of their presuppositions, and their influence on legislation, court decisions and administrative law. 3 s.h. (w) FOLSOM; MCGEE

201. SENIOR SEMINAR IN ECONOMICS.—Problems in theory and applied economics. Readings, reports, and discussion of selected topics. For majors in Economics, with consent of the Department. 3 s.h. (w) STAFF

204. ADVANCED MONEY AND BANKING.—Monetary theory and its statistical and institutional implementation. Particular attention is given to the development of aggregative theories of prices, interest rates and production; the functioning of monetary policy within various theoretical frameworks; and appraisal of the recent use and the limitations of Federal Reserve policy. 3 s.h. (w) YOHE

218. BUSINESS CYCLES.—The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories; modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 s.h. (w) YOHE

219. ECONOMIC PROBLEMS OF UNDER-DEVELOPED AREAS.—Consideration and analysis of the economic and related problems of under-developed countries. Some attention will be given to national and international programs designed to accelerate the solution of these problems. 3 s.h. (w) SPENGLER

231. ECONOMIC HISTORY OF EUROPE.—The economic development of Europe from medieval times to the present, treating such topics as the guilds mercantilism, money, banking, crises, the Industrial Revolution, the interrelationships of government and business, and the economic consequences of war. 3 s.h. (w) SMITH

233. STATE AND LOCAL FINANCE.—A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. Prerequisite: Economics 287 or consent of instructor. 3 s.h. (w) DAVIES

237, 238. STATISTICAL METHODS.—A study of statistical methods appropriate for dealing with problems in business and social science. In addition to developing more thoroughly the subject considered in *Business Statistics,* the following methods will be considered: simple, multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the instructor. *Either semester* may be taken for credit. 6 s.h. (w) HANNA AND WALLACE

243. MATHEMATICAL ECONOMICS.—A systematic survey of mathematical economic theory. The principal topics are vector spaces and matrices, macrostatics, especially input-output systems, and microstatics, especially models of the firm employing game theory and activity analysis. 3 s.h. (w) FERGUSON

244. INTRODUCTION TO ECONOMETRICS.—The implementation of economic theory by statistical testing and estimation. The course is composed of lectures on statistical theory for linear systems and of a workshop in applied econometrics. Data processing and programming for digital computor is studied, and the class participates in solution of a problem by use of computor. Prerequisite: Mathematics 221 and the consent of the instructor. 3 s.h. (w) FERGUSON

257. DYNAMICS OF THE LABOR MOVEMENT.—A study of the forces which have shaped the growth of the labor movement. Special emphasis on the origin of modern trade unionism, relating its growth with western philosophic developments, and with the changing economic and social structure of society in Europe and America. 3 s.h. (w) GOODWIN

262. TRADE UNIONISM AND COLLECTIVE BARGAINING.—An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. Prerequisite: Economics 155 or equivalent. 3 s.h. (w) DE VYVER

265. INTERNATIONAL TRADE AND FINANCE.—A study of fundamental principles of international economic relations. Subjects covered include the economic basis for international specialization and trade, and the economic gains from trade, the balance of international payments, problems of international finance, of international investments and international monetary problems. 3 s.h. (w) GERHARD

268. COMPETITION AND MONOPOLY.—A detailed study of the varieties of imperfectly competitive markets, the economic and legal issues which they raise, and the policy solutions which have been attempted in the United States. 3 s.h. (w) MCGEE

286. LATIN AMERICAN ECONOMICS.—A survey of the problems of economic development in twenty countries. 3 s.h. (w) SMITH

287. PUBLIC FINANCE.—An analysis of the impact of governmental expenditures, revenues, and debt on the allocation of resources, the redistribution of income, and the stabilization of income. 3 s.h. (w) DAVIES

293. ECONOMIC SYSTEMS.—A study of alternative economic systems. An historical and analytical study of the basic elements of capitalism and of collectivist types of economic systems. Particular attention is given to an analysis of the economic system of Soviet Russia. Prerequisite: permission of the department. 3 s.h. (w) HOOVER

294. ECONOMIC FUNCTIONS OF THE STATE.—A continuation of Economics 293. A consideration of the economic functions of society and of the contrasting roles of the state in the various economic systems in carrying on these functions. The Nazi system, the quasisocialized economics of Europe, as well as the modifications of old-style capitalism in the United States are analyzed. Prerequisite: Economics 293. 3 s.h. (w) HOOVER

## ACCOUNTING

57. PRINCIPLES OF ACCOUNTING I.—Provides a basic knowledge of accounting and a consideration of financial statements. Attention is focused on the nature and purpose of accounting, the measurement and classification of economic data, and accounting reports as a tool of management and the investor. 3 s.h. STAFF

58. PRINCIPLES OF ACCOUNTING II.—Concerned with the problems of accounting for the control of monetary assets and costs, the problems of capital stocks and the elementary problems of decision making. The relationship of the firm and national income accounts is examined. Prerequisite: Economics 57. 3 s.h. STAFF

147. ACCOUNTING FOR CONTROL.—This course traces the ways and means of executive control through statistics and industrial accounting. Emphasis is placed upon controlling business enterprises through cost accounting, financial reports, and other techniques. This course is not open to accounting majors. Prerequisite: Economics 57-58. 3 s.h. (w) BLACK AND JOERG

171. ACCOUNTING THEORY.—Basic concepts, principles and postulates are examined and related to the objective of income determination and asset valuation. Financial statements as a source of economic data and investor information are the focal points of the course. Prerequisite: Economics 58. 3 s.h. (w) KELLER

172. CORPORATE ACCOUNTS.—Deals with the complex problem of capital structure and debt. Considers in detail the effect of fluctuation in the purchasing power of the dollar on business affairs. Examines critically the many faceted problem of measuring and appraising business performance. Studies the many aspects of business combinations and foreign operations. Prerequisite: Economics 171. 3 s.h. (w) KELLER

178. ACCOUNTING SYSTEMS.—A presentation of the design and use of basic accounting procedures as applied to specialized business needs. Field trips to selected business units will be arranged. Prerequisite: Economics 171, 172 and the permission of the department. 3 s.h. (w) DICKENS

180. GOVERNMENTAL ACCOUNTING.—Accounting principles and methods used in the control and administration of governmental units. Emphasis is placed upon state, county and municipal governments. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (w) SHIELDS

273, 274. AUDITING, THEORY AND PRACTICE.—A study of basic auditing objectives, standards, ethics, terminology, procedures and reports. Accounting principles and statement presentation are studied from the viewpoint of the auditor. The place and responsibility of both the internal auditor and the public auditor are studied. Prerequisite: Economics 171, 172 and permission of the department. 6 s.h. (w) DICKENS

275, 276. ADVANCED INDUSTRIAL ACCOUNTING AND MANAGEMENT.—A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices fol-

lowed by job-order, process, and standard costing as well as the economics of overhead costs. Prerequisites: Economics 171, 172 and permission of the department. 6 s.h. (W) BLACK

277. INCOME TAX ACCOUNTING.—Presentation of the principles of Federal Income Tax laws as related to individuals, partnerships, estates, trusts and corporations. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (W) SHIELDS

278. ADVANCED PROBLEMS IN INCOME TAXATION.—A critical appraisal of selected topics in the law of income taxation as it relates to corporations, partnerships, estates, and trusts. 3 s.h. (W) KELLER

279. BUDGETING AND CONTROL.—A consideration of methods used in period and project budgeting; the use of accounting, statistical, and mathematical methods in cost control; the use of numerical data in making decisions among alternative courses of action. 3 s.h. (W)

295, 296. ADVANCED ACCOUNTING SEMINAR-THEORY AND PRACTICE.—Thorough practice in classroom to prepare candidates for the Certified Public Accountant examination. The object is to train students to apply accounting principles and to work in classroom under substantially the same conditions as in the examination rooms. Practical accounting problems, auditing analysis and theory of accounts. Prerequisite: Economics 171, 172 and permission of the department. 6 s.h. (W) BLACK

*Those who do not wish credit may take Economics 295, 296 for $25.00 per semester.*

## BUSINESS ADMINISTRATION

109. THE ECONOMIC GEOGRAPHY OF LATIN AMERICA.—This course involves comprehensive study of the resources and people of Mexico, the West Indies, and Central and South America. Special emphasis is placed upon the possibilities and limitations of increases in trade between the United States and the leading Latin-American countries. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E)

114. ECONOMIC GEOGRAPHY OF AFRICA.—A continental study of the natural environmental factors of Africa and the basic economic patterns of adjustments and adaptations on regional or national bases. Prerequisite: Economics 115 or 120. 3 s.h. (E) TUTHILL

115. FUNDAMENTALS OF GEOGRAPHY.—A study of geographic influences consisting of location, maps and their interpretation, climate, topography, soils, minerals, bodies of water, plants, animals, and the works of man. This course is required of all students in the Elementary School Teaching program, and is also recommended for those intending to specialize in foreign trade or the diplomatic service. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E) LANDON

120. ECONOMIC GEOGRAPHY OF THE PACIFIC.—An analysis of the physical influences, natural resources and economic activities of the Orient. Prerequisite: Economics 51-52 or permission of the department. 3 s.h. (E) TUTHILL

138. BUSINESS STATISTICS.—A survey of the principal statistical methods and their application to economics and business administration. The course deals with collection of statistical data, construction of statistical tables and charts, and a brief study of the fundamental statistical concepts and techniques. Offered both semesters. 3 s.h. (W) HANNA AND WALLACE

Open to juniors and to sophomores in the second semester. Not open to seniors except with permission of the Director of Undergraduate Studies.

143. CORPORATION FINANCE.—Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57, 58. Offered both semesters. 3 s.h. (W) JOERG AND ETTIN

144. INVESTMENTS.—A study of the investment policies of individuals and

institutions: the securities markets; sources of investment information and data; the analysis and interpretation of financial statements. Prerequisites: Economics 57, 58 and 143. 3 s.h. (w) JOERG AND ETTIN

181. BUSINESS LAW.—The fundamental principles of law as applied to routine business transactions. The topics presented are: contracts, agency, and negotiable instruments. 3 s.h. (w) GALIFIANAKIS

182. BUSINESS LAW.—A continuation of 181. The topics presented are: partnerships, corporations, sales, personal and real property, mortgages, suretyship, bankruptcy and trade regulation. 3 s.h. (w) GALIFIANAKIS

184. COMMERCIAL LAW FOR ACCOUNTANTS.—A review and summation of commercial law principles as they apply to accounting theory and practice. Emphasis will be placed upon the commercial law sections of the Certified Public Accountant examinations. Students are admitted to the course by permission of the instructor. *For seniors.* 3 s.h. (w) BLACK

185. BUSINESS ADMINISTRATIVE ORGANIZATION.—An analysis of human behavior in administrative organizations followed by a critical examination of alternative theories of administration and organization as relevant to the business firm. 3 s.h. (w) PETHIA

188. PERSONNEL MANAGEMENT.—A study of the fundamental principles and problems of labor management and of collective bargaining under modern industrial conditions and under existing labor legislation. 3 s.h. (w) PETHIA

190. THE USE OF QUANTITATIVE METHODS IN BUSINESS.—Use of analytical tools including linear programming and other methods of operations research in the solution of managerial problems. 3 s.h. (w) NAYLOR

249. PRODUCT MARKETS.—Consumer behavior in price theory, the demand for final products. Relates the firm's demand to the type of market structure, and examines the firm's attempts to predict demand, its attempts to influence demand, and its price policies. 3 s.h. (w) FOLSOM

291. BUSINESS POLICY.—An integrating course where, through analysis of a series of case problems from the top management viewpoint, the student is given practice in arriving at effective courses of action to solve business problems. To complete this course satisfactorily the student will be required to draw upon the institutional knowledge and techniques acquired in the other courses in the department. Prerequisites: Business Administration requirements through the junior year. 3 s.h. (w) JOERG

## DEPARTMENTAL MAJORS

Specialization in one of three major areas in the Department of Economics and Business Administration is possible in the Junior and Senior years. In the Freshman and Sophomore years all majors in the Department take the same required prerequisite courses.

A. *Prerequisites required of all majors in the Department:*

1. Mathematics 17 or 21.
2. Economics 1, 2 or 51-52.
3. Economics 57, 58.

B. *Number of hours needed in each major area:* 24 hours in addition to Economics 51-52 and Economics 57, 58.

1. Economics
   Required courses: Economics 138, 143, 149, 153, 154, and 249.
   Elective courses: 6 hours in courses numbered 200 and above in Economics (not Accounting or Business Administration).
2. Accounting*
   Required courses: Economics 138, 143, 149, 171, 172, 273, 275, and 277.
3. Business Administration*
   Required courses: Economics 138, 143, 149, 153, 154, 185 or 190, 249, and 291.

(* These courses should be taken in the sequence indicated on page 43 of this *Bulletin*.)

C. *Related Work:*

1. Number of hours needed: 18 hours.
2. Departments in which related work is usually taken: Mathematics, psychology, and the social sciences. In special cases courses taken in other departments may be counted as related work with the approval of the department and the dean.

The Department offers work leading to graduation with distinction. See the section on Honors.

## EDUCATION

PROFESSOR CARTWRIGHT, CHAIRMAN; PROFESSOR STUMPF, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BOLMEIER, GITHENS, HOPKINS, AND HURLBURT; ASSOCIATE PROFESSORS COLVER, GEHMAN, JOHNSON, PETTY, RUDISILL, SHUMAN, AND WEITZ; ASSISTANT PROFESSORS BALLANTYNE, MARTIN, AND SUBLETT; INSTRUCTOR NORRIS

Courses in the Department of Education are designed for two groups of students: (1) students who have definitely chosen teaching as their life work or others with teaching experience, and (2) students who desire to study the school as a unique social institution.

Students who expect to teach in the public schools should plan their courses in accordance with the general regulations set forth under Teaching. Students who intend to teach in elementary schools should advise with Professors Petty, Rudisill, Sublett, or Stumpf; those intending to teach in secondary schools should advise with Professors Cartwright, Githens, Hurlburt, Shuman, or Stumpf. Students should confer with these advisers prior to registration each semester.

Students who do not expect to teach but desire merely an understanding of the school as part of a liberal education are advised to elect such courses as 54, 100, 104 for their introductory work in the Department and then to elect further work in accordance with their special interests.

5. DEVELOPMENTAL READING.—A course consisting of study and practice for the improvement of the reading and study skills. Work is provided in such areas as vocabulary, speed of comprehension, critical interpretation, organization of ideas, and versatility of method in reading for different purposes. 3 s.h. (W)
Miss Rudisill

113. HISTORY OF AMERICAN EDUCATION.—A study of American education from colonial times to the present. The development of schools, their organization, administration, curriculum, and methods as seen in relation to the social forces that have produced our particular type of civilization. 3 s.h. (E) Johnson

68. MENTAL HYGIENE.—Development and application of psychological principles of adjustment to personal behavior. Study of factors in the development of personal adjustment as influenced by human relations in the home, school, and community. Not open to students who have had Psychology 115. 3 s.h. (E)
Gehman

100. SOCIAL FOUNDATIONS OF AMERICAN EDUCATION.—A study of the basic features, assumptions, viewpoints, and issues of education in contemporary America. Required of all who intend to practice teach and of all majors in Education. This course should be taken in the junior year. *Either semester.* 3 s.h. (E)
Johnson, Martin, Stumpf, and Sublett

101. ELEMENTARY EDUCATION: PRINCIPLES.—The nature, subject matter, and organization for instruction of elementary education in the primary and grammar grades. Required in the elementary-education major. *Either semester.* 2 s.h. (E) Petty, Sublett

102. ELEMENTARY EDUCATION: PRACTICE.—Methods and problems of instruction in elementary education and their applications and solutions in the classroom. Required in the elementary-education major. Prerequisite: 2.10 average over-all and in the elementary-education major. *Either semester.* 6 s.h. (E)
Petty, Sublett

105. ELEMENTARY EDUCATION: READING.—The process, methods, and materials basic to the teaching of reading in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) MISS RUDISILL

106. ELEMENTARY EDUCATION: LANGUAGE ARTS.—The processes, methods, and materials basic to the teaching of the language arts in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) PETTY, MISS RUDISILL

107. ELEMENTARY EDUCATION: ARITHMETIC.—The processes, methods, and materials basic to the teaching of arithmetic in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) PETTY

108. ELEMENTARY EDUCATION: SCIENCE.—The principles, methods, and materials basic to the teaching of the sciences in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) GITHENS

114. HISTORY OF EDUCATION IN EUROPEAN CULTURE.—A study of the evolution of the educational theory and practice from Greek civilization through 19th-century Europe. Emphasis will be placed upon the educational ideas of outstanding thinkers from Plato to Spencer. 3 s.h. (E) JOHNSON

118. EDUCATIONAL PSYCHOLOGY.—A study of the psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 3 s.h. (E) BALLANTYNE, GEHMAN, MCHUGH

123. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL.—The arts of writing, reading, speaking, and listening in relation to the elementary school curriculum. Required of all students majoring in Elementary Education. Either semester. 3 s.h. PETTY

142. CHILDREN'S LITERATURE.—Students enrolled will be allowed to specialize in literature of either the primary or the grammar grades. 3 s.h. (E) (Not offered in 1964-65.) MISS RUDISILL

151. PUBLIC SCHOOL MUSIC EDUCATION.—Required in the elementary-education major. See Music Education 151 for description.

152. PUBLIC SCHOOL MUSIC LITERATURE.—Required in the elementary-education major. See Music Education 152 for description.

153. VOCAL MUSIC IN THE PUBLIC SCHOOL.—See Music Education 153 for description.

154. INSTRUMENTAL MUSIC IN THE PUBLIC SCHOOL.—See Music Education 154 for description.

161. INTEGRATED ART IN THE PUBLIC SCHOOL.—Work in materials and methods applied in two-dimensional art. Required in the elementary-education major. *Either semester.* 2 s.h. (E) STARS

162. PLASTIC ART IN THE PUBLIC SCHOOL.—Work in basic three dimensional art, giving an understanding of different sculptural media with special emphasis on ceramics. The course is designed for students in elementary and secondary art education, and will provide credit toward the North Carolina Elementary and Secondary Teaching Certificates. 3 s.h. (E) STARS

201. TEACHING AND SUPERVISION OF ARITHMETIC.—Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and graduation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. 3 s.h. (E) PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, an analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. Prerequisite: six semester hours in education. 3 s.h. (E) BOLMEIER, HURLBURT, AND STUMPF

204. THE SCHOOL AS AN INSTITUTION.—Consideration is given to the

place of the school in the American social order, and its adaptation to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunities. 3 s.h. (E) BOLMEIER, EDWARDS

210. INTRODUCTION TO EDUCATIONAL RESEARCH.—The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an understanding of the essential characteristics of good research work. The course is designed to be liberalizing as well as technical. 3 s.h. (E) STUMPF

215. SECONDARY EDUCATION: PRINCIPLES.—Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Prerequisite: 2.0 average over-all and in teaching field or fields. Must be accompanied by Education 216. *Either semester.* 3 s.h. (E) GITHENS, HURLBURT, SHUMAN

216. SECONDARY EDUCATION: INTERNSHIP.—Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215. Prerequisite: 2.0 average over-all and in the major or teaching field. *Either semester.* 6 s.h. (E) CARTWRIGHT, GITHENS, HURLBURT, SHUMAN

NOTE: Education 215, 216, 118, and one other course, depending on the student's field, constitute a semester's work during the senior year.

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 s.h. (E) GEHMAN, WEITZ

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials and methods in the teaching of history and the social studies. 3 s.h. (E) CARTWRIGHT

226. TEACHING READING IN THE ELEMENTARY SCHOOL.—A study of the nature of the reading process and of principles, methods and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. Practice is provided with elementary-school children suffering reading retardation, in testing, diagnosis, and daily remedial teaching. 3 s.h (E) MISS RUDISILL

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 s.h. (E) CARTWRIGHT

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 s.h. (E) HURLBURT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 s.h. (E) BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems, and guiding students' reading. 3 s.h. (E) CARTWRIGHT

236. TEACHING READING IN THE SECONDARY SCHOOLS.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 s.h. (E) MISS RUDISILL

237. LITERATURE FOR ADOLESCENTS.—The course offers a critical survey

of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 s.h. SHUMAN

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 s.h. (E) BOWMAN, SHUMAN

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 s.h. (W) COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (W) COLVER

234. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (E) GEHMAN

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 s.h. (E) REYNOLDS

253. SCHOOL LAW.—The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 s.h. (E) BOLMEIER

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education with opportunity for individual research. Prerequisite: 12 semester hours in the Department, including a course in educational psychology. 3 s.h. (E) COLVER, WEITZ

266. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 s.h. (E) GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 s.h. (E) GITHENS

290. ADMINISTRATION OF SCHOOL PROPERTY.—Planning and management of the school plant and its equipment to meet instructional and community needs for immediate and long-range purposes. This course is intended for teachers and principals as well as for superintendents. Areas to be treated include site selection; trends in design, lighting, ventilation and heating; custodial service and maintenance; and financing. 3 s.h. (E) STUMPF

## DEPARTMENTAL MAJOR

*Major Requirements:* Number of hours needed: 24 hours in the Department, including 6 hours in senior graduate courses.

*Related Work:* Sufficient work in subjects to be taught to meet certification requirements in the state in which student intends to teach.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

### MATERIALS AND METHODS COURSES

Certain courses concerned with materials and methods in teaching the various subjects in the public school curriculum are listed in the proper subject matter department. These courses are intended to give credit on teaching certificates and are recommended by the Department of Education for such credit.

### MAJORS IN ELEMENTARY EDUCATION AND SCIENCE EDUCATION

Students desiring to teach in elementary schools or in science in secondary schools should read the descriptions of these programs of study listed under the proper headings elsewhere in this *Bulletin*.

## ENGLISH

PROFESSOR TURNER, CHAIRMAN; ASSOCIATE PROFESSOR FERGUSON, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR BEVINGTON, ACTING DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR PATTON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BLACKBURN, BOWMAN, BOYCE, DUFFEY, GOHDES, KNIGHT, LIEVSAY, LUMIANSKY, NYGARD, SANDERS, STEVENSON, AND WARD; ASSOCIATE PROFESSORS BEVINGTON, BUDD, HARWELL, HENINGER, REARDON, SMITH, WETHERBY, AND WILLIAMS; ASSISTANT PROFESSORS ANDERSON, CLOGAN, JORDAN, MICHALAK, POTEAT, PRICE, RANDALL, REIMAN, RIDDEL, SCHWERMAN, AND WILLIAMS; INSTRUCTORS GERBER, JONES, KRUEGER, MOORE, ROBINSON, AND VAN KLUYVE; MRS. HALLORAN; MESSRS. BABIN, BELFLOWER, CATE, CHAPPELL, CONE, COOK, DUNN, GRAVES, HALE, HASKIN, KAUVAR, KELLY, KUIST, LA VIA, LUDINGTON, MARRS, MASCITELLI, MCELROY, PRIDGEON, SPARLING, SUTTON, TUTT, VAN, AND WHISNANT

1-2. FRESHMAN COMPOSITION.—Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the Twentieth Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. (E & W) STAFF

53. ADVANCED GRAMMAR AND WRITING.—Emphasis is placed first on the student's mastering the fundamental principles of English grammar and the other essentials of correct writing. 3 s.h. (E) JORDAN

65-66. IMAGINATIVE WRITING.—A foundation course in imaginative writing, both prose and verse. Primarily for sophomores, but in special cases open to students from other classes. The consent of the instructor is required. 6 s.h. (E) SANDERS

93. TECHNICAL COMMUNICATION.—Emphasis will be placed on the writing of business letters, technical reports, and articles for submission to technical journals. Approximately one-third of the course will provide training in the oral presentation of various materials. Prerequisite: English 1 and 2. 3 s.h. (W) HARWELL AND STAFF

100. ENGLISH FOR FOREIGN STUDENTS.—Designed to assist the student to whom English is a second language to perfect his speaking and understanding of the language. Drills in writing, speaking, listening and the American idiom. Open to all students and their wives, and to any persons and spouses with an official connection with the University. Those who do not pay full-time student fees may register for a fee of $5.00. No credit. (W) WETHERBY

101. ADVANCED EXPOSITORY WRITING.—Designed for students interested in expository writing, this is a course in advanced composition. Primarily for

juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) FERGUSON

103-104. NARRATIVE WRITING.—Class discussion of students' manuscripts, supplemented by a critical evaluation of selected short stories and a novel and by individual conferences with the instructor. Open to sophomores, juniors, and seniors. Students desiring admission to the course should present a piece of writing to the instructor as early as possible in the spring semester. Prerequisite for English 104: English 103. 6 s.h. (E) BLACKBURN

## SPEECH AND DRAMA

51. ESSENTIALS OF PUBLIC SPEAKING.—A basic course in public speaking, designed to give the student the poise and confidence necessary to think and speak freely before an audience. Particular attention is paid to the gathering and organization of speech materials and to oral presentation. Not open ordinarily to juniors and seniors. 3 s.h. (W) MICHALAK, REARDON, AND MISS SCHWERMAN

118. PERSUASIVE SPEAKING.—The psychological and sociological techniques used in gaining acceptance of ideas through speech. Study is made of the factors influencing human behavior; audience analysis and motivation; choice, arrangement, and adaptation of material. Extensive practice in persuasive speaking. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (W) WETHERBY

119. HISTORY OF THE THEATER.—The origin and development of drama, acting, and stagecraft from ancient Greece to the modern European and American theater. Production problems of representative plays of the various periods will be discussed. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (W) MICHALAK

121. STAGECRAFT.—An introductory course on the technical aspects of play production: scenery, lighting, properties, make-up, and costuming. Laboratory work will be coordinated with the various productions of the Duke Players. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) MICHALAK

122. PLAY PRODUCTION.—An introduction to the methods of producing a play; theater organization, play selection, casting, and rehearsal. Lectures and laboratory. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) MICHALAK

139. THE SPEAKING VOICE.—A study of the mechanisms of speech. Emphasis is placed on providing the skills necessary for the improvement of voice, pronunciation, and diction. Methods of correcting minor functional speech disorders will also be studied. 3 s.h. (W) MISS SCHWERMAN AND WETHERBY

150. ORAL INTERPRETATION OF LITERATURE.—A study of poetry and certain types of prose, with practice in the technique by which they may be communicated to an audience. 3 s.h. (W) MISS SCHWERMAN

151. ESSENTIALS OF PUBLIC SPEAKING.—A basic course in public speaking for juniors and seniors dealing with the same matters as 51. (Not open for credit to students who have taken 51.) 3 s.h. (E & W) MICHALAK, REARDON, AND MISS SCHWERMAN

152. ARGUMENTATION.—The principles of argumentation and debating. The techniques of analysis, investigation, evidence, reasoning, brief making, and refutation. Participation in class discussions and debates. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (W) WETHERBY

171, 172. BROADCASTING.—A study of the background of radio and television broadcasting. The first semester covers the development of broadcasting as an industry and as a literary form. The second semester studies the legal and social aspects, and the various program forms. 6 s.h. (W) WETHERBY

## ENGLISH AND AMERICAN LITERATURE AND LANGUAGE

55, 56. REPRESENTATIVE BRITISH WRITERS.—The following works are studied in the first semester: Chaucer's Prologue to *The Canterbury Tales* and at

least two tales, Shakespeare's *I Henry IV, Hamlet* or *King Lear,* and one other play, John Donne's poetry (selections), Milton's *Paradise Lost* (selections) and some of the shorter poems; in the second semester: Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 6 s.h. (E & W) STAFF

57, 58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works. The first semester will include Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; the second will include James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. 6 s.h. (E & W) STAFF

111, 112. EIGHTEENTH-CENTURY LITERATURE.—The writers emphasized in the first semester are Pope, Swift, Defoe, Addison, Steele, and Fielding; in the second semester, Johnson, Gray, Boswell, Goldsmith, Sheridan, the later novelists, and Blake. 6 s.h. (E) BOYCE, FERGUSON, AND WARD

117. MILTON.—Milton's poetry and prose, together with their relation to the period and to other great works of literature. 3 s.h. (E) LIEVSAY

123, 124. SHAKESPEARE.—In the first semester twelve plays, before 1600; in the second semester about ten plays, after 1600. 6 s.h. (E & W) BOWMAN, RANDALL, WARD, AND WILLIAMS

125, 126. ENGLISH LITERATURE, 1789-1832.—The course begins with selections from the poetry of the forerunners of Romanticism. The chief emphasis in the first semester is on the work of the older Romantics: Wordsworth, Coleridge, Lamb, and Hazlitt. In the second semester the chief emphasis is on the work of the younger Romantics: Byron, Shelley, Keats, and DeQuincey. 6 s.h. (W) PATTON AND REIMAN

127. THE ENGLISH NOVEL FROM THE BEGINNINGS TO 1800.—Some of the writers studied are Nashe, Deloney, Lyly, Sidney, Bunyan, Behn, Defoe, Richardson, Fielding, Smollett, and Sterne. (Not open for credit to students who have taken 157.) 3 s.h. (E) RANDALL

128. THE ENGLISH NOVEL IN THE NINETEENTH CENTURY.—Some of the writers studied are Scott, Austen, Dickens, Thackeray, Trollop, the Brontës, George Eliot, Meredith, Butler, and Hardy. (Not open for credit to students who have taken 157.) 3 s.h. (E) FERGUSON

129. THE ENGLISH NOVEL IN THE TWENTIETH CENTURY.—Some of the writers studied are Conrad, Lawrence, Forster, Joyce, Woolf, Huxley, Cary, Amis, and Golding. (Not open for credit to students who have taken 158.) 3 s.h. (E) SMITH

131, 132. ENGLISH LITERATURE, 1832-1900.—A study of the chief writers of poetry and prose from Carlyle to Yeats. The major writers studied in the first semester are Carlyle, Tennyson, Browning, Macaulay, Mill, and Newman; in the second semester, Arnold, Ruskin, the Rossettis, Morris, Swinburne, Pater, and Yeats. Collateral reading from novels of the period. 6 s.h. (E) BEVINGTON, SANDERS, AND STEVENSON

133, 134. TWENTIETH-CENTURY POETRY.—A study of twentieth-century poetry and criticism of poetry in England and America. Problems in critical analysis and interpretation. First semester: the emphasis is on sources in nineteenth-century Symbolism and on the poetry of Hopkins, Yeats, Eliot, Pound, and Stevens. Second semester: the emphasis is on the poets and the poetic theories of the last thirty years. 6 s.h. (E) MRS. BEVINGTON

137, 138. AMERICAN LITERATURE.—A survey from colonial times to the present. Selections and complete novels by Hawthorne and Melville in the first semester; Twain, Henry James, Howells, and others in the second. (Not open for credit to students who have taken a matching semester of 57, 58.) 6 s.h. (E & W) ANDERSON, BUDD, RIDDEL, AND WILLIAMS

141. CHAUCER.—*The Canterbury Tales* and the minor poems, with attention to their literary and social background. 3 s.h. (W) VAN KLUYVE

142. ENGLISH LITERATURE OF THE MIDDLE AGES.—A study of the principal forms and examples of English prose, poetry, and drama of the Anglo-Saxon and Middle English periods (excluding Chaucer), read in translation. 3 s.h.

143, 144. ENGLISH LITERATURE: ELIZABETHAN AND SEVENTEENTH CENTURY.—A study of the poetry, prose, and drama of the period. First semester: the emphasis in poetry is on Wyatt, Sidney, Spenser, Raleigh, Shakespeare; in prose, on Sidney and Florio's Montaigne; in drama, on Marlowe. Second semester: the chief emphasis is on the metaphysical poets—Donne through Vaughan. Prose: Bacon, Burton, Donne, Browne. Drama: Jonson, Webster, Ford. 6 s.h. (E) BLACKBURN

147. THE LITERARY EXPRESSION OF SCIENTIFIC THOUGHT.—Readings which delineate man's changing concept of nature, with emphasis on both the scientific thought and the literary merit of each text. Representative works of Hesiod, Plato, Aristotle, Lucretius, Descartes, Thomas Browne, Bertrand Russell, and others. Primarily for engineering students and majors in science. 3 s.h. (W) HENINGER

148. SATIRE.—An exploration of the nature and art of literary satire, based on examples, mostly English and American, of various forms and kinds; character-sketch, dialogue of the dead, fable, verse-narrative, eulogy, drama, novel, etc. Prerequisite: English 55, 56. 3 s.h. (E) BOYCE

150. ORAL INTERPRETATION OF LITERATURE.—See under "Speech and Drama."

153, 154. READINGS IN EUROPEAN LITERATURE.—Significant works are read in translation and related to similar works in English literature. The first semester includes selected writings of Homer, the Greek dramatists, Plato, Virgil, and Ovid. The second semester comprises works by Dante, More, Cervantes, Molière, Voltaire, Goethe, Dostoevski, Ibsen, and Kafka. 6 s.h. (W) HENINGER, KRUEGER, AND RANDALL

155. MODERN EUROPEAN DRAMA.—Continental and Irish plays from Ibsen to Brecht are read in relation to the modern drama of ideas and to the free theater movement. 3 s.h. (E) REARDON

156. MODERN ENGLISH AND AMERICAN DRAMA.—Plays from Pinero to Arthur Miller are read and discussed in relation to European origins and to the contemporary scene. 3 s.h. (E) REARDON

161. DEVELOPMENT OF THE ENGLISH LANGUAGE.—An elementary historical study of the English language: patterns of change and growth, with some attention to methods of philological inquiry and the relations of philology to literary studies. 3 s.h. (E) (Not offered in 1964-65.)

162. MODERN ENGLISH GRAMMAR.—A descriptive study of written and spoken American English of the present time, with attention to standards of usage and pronunciation and the relations of grammar to composition. 3 s.h. (E) CLOGAN

165, 166. AMERICAN FICTION.—A survey of the novel and the short story. The first semester covers the nineteenth century, from Washington Irving to Stephen Crane; the second covers the twentieth century through ten representative books. 6 s.h. (W) BUDD

167, 168. THE EUROPEAN EPIC TRADITION.—The development of the Epic tradition seen through detailed analysis of the major texts and major themes: Homer, Vergil, *Beowulf*, Dante, Cervantes, Milton, Tolstoy, Joyce. 6 s.h. (W) KNIGHT

181. CONFERENCE ON DRAMA.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

182. CONFERENCE ON POETRY.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

183. CONFERENCE ON FICTION.—Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

184. CONFERENCE ON PROSE NON-FICTION OR A SPECIAL TOPIC.—

Primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing. 3 s.h.

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Department. 6 s.h.

197-198. SENIOR SEMINAR IN ENGLISH.—A course designed to offer guidance in the analysis and interpretation of English and American literature to students of superior ability. Comparative studies will be encouraged, and considerable reading will be required in critical and aesthetic theory. Emphasis will be placed upon the final essay. Admission by invitation of the Department. 6 s.h. (E & W) BEVINGTON, BLACKBURN, AND PATTON

FOR SENIORS AND GRADUATES

203. CHAUCER.—The minor poems, *Troilus,* and *The Canterbury Tales.* 3 s.h. (W) NYGARD

207, 208. HISTORY OF THE ENGLISH LANGUAGE.—A survey of the language from Old to Present English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 6 s.h. (W) LUMIANSKY AND NYGARD

209. PRESENT-DAY ENGLISH.—A description of present-day American English, with special attention given to the phonemic, morphemic, and syntactical structure of the language; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage; and the practical application of language study to composition. 3 s.h. (W) NYGARD

213. INTRODUCTION TO FOLKLORE.—A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 s.h. (W) NYGARD

215, 216. ELIZABETHAN DRAMA.—Study of one or two major dramatists (Jonson or Beaumont and Fletcher) and extensive reading in other writers (Heywood, Ford, Massinger, Marlowe, Middleton) with emphasis on the nature and qualities of their work in relation to its historical background. 6 s.h. (W) LIEVSAY

217. MILTON.—Milton's poetry and prose, with emphasis on the major poems. 3 s.h. (W) LIEVSAY

218. SPENSER.—The reading of Spenser's works, with chief attention to *The Faerie Queene.* 3 s.h. (W) HENINGER

219, 220. THE EIGHTEENTH CENTURY.—Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson, Boswell, Collins, Goldsmith, the novelists and other writers. 6 s.h. (W) BOYCE AND FERGUSON

221, 222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—The Romantic poets and prose writers from Scott to the early Carlyle, with special attention to Wordsworth, Coleridge, and Keats. 6 s.h. (W) BEVINGTON, SANDERS, AND STEVENSON

223, 224. ENGLISH LITERATURE OF THE LATER NINETEENTH CENTURY.—The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson, and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 s.h. (W) BEVINGTON, SANDERS, AND STEVENSON

227. LITERARY CRITICISM.—Readings from the major critics, Plato to the present, with emphasis on formative ideas and historical continuity. 3 s.h. (W) LIEVSAY

229, 230. AMERICAN LITERATURE, 1800-1865.—The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 s.h. (W) BUDD AND TURNER

233, 234. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors of the period. The first semester's assignments will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local

Colorists; the second semester's, Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 s.h. (w) GOHDES

235, 236. AMERICAN LITERATURE SINCE 1920.—The first semester will include Sherwood Anderson, Mencken, Lewis, Lardner, Gertrude Stein, Pound, Eliot, Cummings, Hemingway, Faulkner, and Fitzgerald; the second semester, Dos Passos, Farrell, Steinbeck, Wolfe, MacLeish, Stephen Vincent Benet, Richard Wright, and more recent writers. 6 s.h. (w) DUFFEY

237. ENGLISH DRAMA, 1642-1800.—The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 s.h. (w) WARD

239. SHAKESPEARE.—The plays and poems. 3 s.h. (w) WILLIAMS

244. LITERARY BIOGRAPHY.—Selected works from Plutarch to Strachey with discussion of the historical development of biography, the various methods it has used, and the various theories which have been held about it. 3 s.h. (w) SANDERS

251, 252. ENGLISH LITERATURE IN THE SEVENTEENTH CENTURY.—Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 s.h. (w) WARD

261, 262. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 s.h. (w) SMITH

264. MAJOR DEVELOPMENTS IN CONTEMPORARY AMERICAN POETRY.—The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Hart Crane, the "Fugitives," and a selection from the poets of the present generation. 3 s.h. (w) (Not offered in 1964-65.)

266. RECENT CRITICAL THOUGHT.—Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 s.h. DUFFEY

269, 270. SOUTHERN LITERATURE.—The principal authors and the chief literary developments from the beginnings to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 s.h. (w) TURNER

274. AMERICAN HUMOR.—The development of the native tradition in the Down-East humorists and the humorists of the Old Southwest. Extensive reading in Mark Twain and his contemporaries, and some attention to the continuation of the tradition after Mark Twain. 3 s.h. (w) TURNER

277, 278. ENGLISH LITERATURE OF THE SIXTEENTH CENTURY.—First semester devoted to development of prose forms and styles from Caxton to Hooker and Bacon; second semester to representative non-dramatic poetry, exclusive of Spenser. 6 s.h. (w)

### DEPARTMENTAL MAJOR

*Prerequisite:* English 55-56.

*Major Requirements:* Twenty-four semester hours above the sophomore level in writing, speech, drama, literature, and language; at least eighteen hours must be in English and American literature meeting the following requirements of distribution:

1. Six hours at the junior-senior level (generally to be taken in the junior year) in one of five designated period courses (143-144, 111-112, 125-126, 131-132, 137-138).
2. Three hours in one of the major authors: Chaucer, Shakespeare, or Milton (141, 203, 123, 124, 239, 117, 217).

3. Six hours (to be taken in the senior year) in senior-graduate courses, numbered at the 200 level. These courses are to be chosen so that surveys of particular periods do not heavily duplicate in subject matter the courses taken in (1) above. Conference courses numbered 181 to 184 may be substituted for parts or all of this requirement.
4. The remaining hours must meet the following distribution requirements:
   (a) Three hours of English literature before 1800, unless the requirement is met in (1) or (3) above.
   (b) Three hours of English literature after 1800, unless the requirement is met in (1) or (3) above.
   (c) Three hours of American literature, unless the requirement is met in (1) or (3) above.

*Related Work:* Eighteen semester hours, which may include appropriate courses in history, aesthetics, art, music, foreign languages and literature, literature in translation, philosophy, religion, linguistics, and the teaching of English. Related work must be taken in at least two departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

## FORESTRY

Students without a Bachelor's degree who are preparing for work in forestry as a profession should take the courses outlined under the Academic-Forestry Combination in the section on Requirements for Degrees. However, with the consent of the instructor in charge, certain forestry courses may be elected by students in other curricular provided they have had adequate preparation (see *Bulletin of the School of Forestry*).

Members of the sophomore, junior, and senior classes, whether or not registered in the Academic-Forestry Combination, may elect the following course:

52. PRINCIPLES OF FORESTRY.—Introduction to forestry in the United States; growth of trees and forests; social and economic problems in developing America's primary renewable natural resource; contribution of forests to the national economy. 2 s.h. (W) MR. WHITE

## GEOLOGY

PROFESSOR BERRY, CHAIRMAN; ASSOCIATE PROFESSOR HERON, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR DU BAR AND ASSISTANT PROFESSOR FURBISH

All students who wish to take a B.S. degree in Geology must take an approved summer field course. This normally is taken during the summer of the junior year.

51. GENERAL GEOLOGY.—This course is designed to give a general view of the surface features of the earth, their origin, structure and materials. Illustrative materials are studied in the laboratory. Excursions are made to neighboring points where the principles of the science are studied in the field. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) HERON AND STAFF

52. GENERAL GEOLOGY.—This course is designed to give some knowledge of the chief events of the earth's history. Excursions will be made to suitable neighboring localities. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 51. 4 s.h. (E) HERON AND DU BAR

57. GEOMORPHOLOGY.—A detailed study of the process at work on the land surface and the topographic forms produced by them under different climatic conditions. This course includes practice in the interpretation of topographic maps. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) BERRY

103. FUNDAMENTALS OF MINERALOGY.—Principles of crystallography, crystal chemistry, crystal physics and mineral identification. Excursions will be made to neighboring mineral localities. Three one-hour lectures or recitations

and one three-hour laboratory. Prerequisite: Chemistry 1, 2 or 2 only (may be taken concurrently). 4 s.h. (E) FURBISH

106. IGNEOUS AND METAMORPHIC ROCKS.—Silicate mineralogy, theory of origin and classification of igneous and metamorphic rocks and rock identification. Two one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 3 s.h. (E) FURBISH

108. SEDIMENTARY ROCKS.—Authigenic minerals, theory of origin and classification of sedimentary rocks and rock identification. One one-hour lecture or recitation and one three-hour laboratory. Prerequisite: Geology 51. 2 s.h. (E) HERON

143. PRINCIPLES OF STRATIGRAPHY.—Theory of correlation, sedimentation and stratigraphic units. Three one-hour lectures or recitation. Prerequisite: Geology 52. 3 s.h. (E) HERON

151. ECONOMIC GEOLOGY.—Study of world distribution, geologic occurrence and uses of important mineral deposits. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 4 s.h. (E) BERRY

152. INTRODUCTORY PALEONTOLOGY.—Systematic study of invertebrate paleontology, dealing mainly with generic characters of the fossil invertebrates and their use in identifying and correlating geologic formations. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisites: Geology 51, 52. 4 s.h. (E) BERRY

164. INTRODUCTION TO GEOLOGIC FIELD METHODS.—Principles and techniques used in geologic mapping and field studies including applicable methods of surveying and the use of aerial photographs. Field excursions will be made when possible. Two hours of lectures and three hours of laboratory each week. Prerequisites: Geology 51 and 52. 3 s.h. (E) STAFF

166. STRUCTURE.—Structural features of the earth's crust. Three one-hour lectures or recitations. Prerequisites: Geology 106, 143. 3 s.h. (E) STAFF

175, 176. MAJORS SEMINAR.—Review of current literature in selected fields of geology. Required of all majors; 175 in the spring of the Junior year; 176 in the spring of the Senior year. One hour per week. 2 s.h. (E) STAFF

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the Director of Undergraduate Studies. (See page 36).

### DEPARTMENTAL MAJOR

*Prerequisites:* Chemistry 1, 2, Geology 51, and 52.

*Major Requirements:* A.B. degree, a minimum of 24 hours of geology above the elementary courses (51, 52). B.S. degree, a minimum of 24 hours of geology above the elementary courses (51, 52) plus a summer field course.

*Related Work:* 1. Number of hours needed for A.B., 12 s.h.; for B.S., 18 s.h. 2. Required courses, Mathematics 21, 22. 3. Departments in which related work is usually taken, chemistry, mathematics, physics, zoology, and engineering.

## GERMANIC LANGUAGES AND LITERATURE

PROFESSOR SALINGER, CHAIRMAN; ASSOCIATE PROFESSOR SEYMOUR, DIRECTOR OF UNDERGRADUATE STUDIES AND SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS MAXWELL, PHELPS, AND WILLSON; ASSISTANT PROFESSOR DEINERT; INSTRUCTORS ALT, DAY, AND PITTERMAN

1-2. ELEMENTARY GERMAN.—Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. 8 s.h. (E & W) SEYMOUR AND STAFF

63-64. INTERMEDIATE GERMAN.—Prerequisite: German 1-2 or equivalent. 6 s.h. (E & W) PHELPS AND STAFF

German 63-64 is prerequisite for 91, 92 and all 100 group courses.

91, 92. INTRODUCTION TO GERMAN LITERATURE.—A third-year course,

completing the language requirement. Reading from representative German authors. 4 s.h. DEINERT, PHELPS, SALINGER, SEYMOUR, AND WILLSON

107, 108. SCIENTIFIC GERMAN.—The German language as used in the various contemporary sciences. 4 s.h. MAXWELL

109, 110. GERMAN PROSE FICTION.—Origin and development of the German novel and short story with special emphasis on the nineteenth century. 4 s.h. PHELPS, SALINGER, AND SEYMOUR

115, 116. GERMAN DRAMA OF THE NINETEENTH CENTURY.—A study of leading dramatists from Kleist to Hauptmann. 4 s.h. SEYMOUR

117, 118. GERMAN CONVERSATION.—A course in writing and speaking German, restricted to German majors and other students by permission of the Department. 6 s.h. ALT AND PITTERMANN

119, 120. SURVEY OF GERMAN LITERATURE.—German literature and its cultural background. First semester: From the beginnings to the romantic period. Second semester: From romanticism to the present. Lectures, reports and readings. 6 s.h. DEINERT, PHELPS, SALINGER, AND WILLSON

125, 126. CONTEMPORARY GERMAN LITERATURE.—A study of representative works of the twentieth century. Kafka will be read first semester; Thomas Mann's selected works will be read second semester. 4 s.h. MAXWELL

131, 132. INTRODUCTION TO GOETHE.—The reading of his early novels and epics and works pertaining to his life. 4 s.h. MAXWELL

133, 134. THE GERMAN LYRIC.—A survey of the development of German lyric poetry, principally from Klopstock to Rilke (with some attention to mediaeval and early modern poets), seen as poetic reflection of German thought. 4 s.h. SALINGER

191, 192. INDEPENDENT STUDY.—Open only to qualified students by permission of the Department. See p. 36. DEINERT, PHELPS, AND SALINGER

201, 202. GOETHE.—A study of his life and works in the light of his lasting significance to world literature. 6 s.h. SALINGER

203, 204. EIGHTEENTH CENTURY.—Eighteenth-century German literature in its relation to contemporary European philosophy. 6 s.h. PHELPS

205, 206. MIDDLE HIGH GERMAN.—The language and literature of Germany's first classical period. 6 s.h. SEYMOUR

207, 208. GERMAN ROMANTICISM.—The course covers the entire field of German romanticism from 1800. 6 s.h. WILLSON

209, 210. KLEIST, GRILLPARZER, and HEBBEL.—The development of the drama in Germany and Austria between Schiller and Naturalism. 6 s.h. SALINGER AND WILLSON

211, 212. HEINRICH HEINE AND HIS TIME.—Heine's life and thought, and the contemporary European culture. 6 s.h. SALINGER

213. NINETEENTH-CENTURY LITERATURE.—From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm and Fontane. 3 s.h. DEINERT

214. THE TWENTIETH CENTURY.—From Naturalism to the present, with emphasis on Hauptmann, Hofmannsthal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht and Benn. 3 s.h. DEINERT

215. SEVENTEENTH-CENTURY LITERATURE.—A study of the leading writers of the Baroque, seen against the background of their time. 3 s.h. DEINERT

216. HISTORY OF THE GERMAN LANGUAGE.—The development of the phonology, morphology and syntax of German from earliest beginnings to the present. 3 s.h. SEYMOUR

218. THE TEACHING OF GERMAN.—Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks

and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 s.h. PHELPS

### DEPARTMENTAL MAJOR

1. *Prerequisites:* German 1-2 and 63-64, or equivalent.

2. *Major Requirements:* Twenty-four semester hours in the German Department. Twelve of these must be selected from the 200 courses. The remaining twelve may be selected from any courses in the 100 group. German 107, 108 does not count toward the major. German 117, 118, and 119, 120 (as well as Linguistics 101) are highly recommended to any student majoring in the Department.

3. *Related Work:* Eighteen semester hours, chosen from the humanities with the approval of the Germanic Languages Department.

## HEALTH AND PHYSICAL EDUCATION

TRINITY COLLEGE AND THE COLLEGE OF ENGINEERING

MR. CAMERON, DIRECTOR; PROFESSOR FRIEDRICH, DIRECTOR OF UNDERGRADUATE STUDIES AND SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS BLY, COX, FALCONE, HARRISON, AND PERSONS; ASSISTANT PROFESSORS BUEHLER, CHAMBERS, SKINNER; MESSRS. BUBAS, HAGLER, HARVEY, LUTZ, AND WATERS

### REQUIRED PHYSICAL EDUCATION FOR MEN

A student must complete four semesters of physical education in order to fulfill graduation requirements.

All students are given a medical and physical examination before registration. Students who have physical handicaps must register in Corrective Physical Education. Students assigned to these classes will take work suited to their particular needs and capacities.

Students without defects will register in Physical Education 1 and 2 in their freshman year. The activities are selected from the following: apparatus, combative games (fundamentals of basketball, speedball, soccer, volleyball), swimming, and tumbling. Swimming is required each semester of the freshman year.

After a student has completed Physical Education 1 and 2, he may complete his physical education requirement by electing and satisfactorily completing two courses from the following individual and team sports: 51. Apparatus-Tumbling; 52. Badminton; 53. Basketball-Handball; 56. Swimming, advanced; 57. Tennis-Volleyball; 58. Golf. A fee of $10.00 for the semester, payable at the Treasurer's Office, is charged for course 58, Golf.

### ELECTIVES IN PHYSICAL EDUCATION

The courses listed below are arranged to meet the increasing demand for teachers who are qualified to coach and teach Physical Education. They are open for credit only to students in the High School Teaching Program or to majors in Education. These students may elect 18 semester hours from courses in this group. Six semester hours may be elected from the courses listed under Special Methods in Physical Education, 9 semester hours from the courses listed under Theory and Practice in Physical Education, and 3 semester hours from Health Education. The courses should be selected with the advice of the Director of Undergraduate Studies in order to meet the needs of the individual.

### SPECIAL METHODS IN PHYSICAL EDUCATION

163. ATHLETIC COACHING IN SECONDARY SCHOOLS.—Theory and practice in the fundamentals of coaching baseball and track. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w)
CHAMBERS AND PARKER

164. ATHLETIC COACHING IN SECONDARY SCHOOLS.—Theory and practice in the fundamentals of coaching football and basketball. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w)
FALCONE AND WATERS

### THEORY AND PRACTICE IN PHYSICAL EDUCATION

65. HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION.—A study of the objectives and scientific principles upon which physical education is based. The history of physical education is studied in order to show the changes in objectives, principles, and methods and as an aid in the interpretation of trends. Open to sophomores, juniors, and seniors. 3 s.h. (w) FRIEDRICH

172. RECREATIONAL LEADERSHIP.—Theories and philosophies of play and recreation with application to community, school and family situations.

182. THE ADMINISTRATION OF ATHLETICS IN SECONDARY SCHOOLS. —A case study appraisal of health and physical education problems experienced in the organization and administration of health and physical education. 3 s.h. HARRISON

190. PROTECTIVE PRACTICES IN PHYSICAL EDUCATION.—A study of safety measures, including training and first aid. Open to juniors and seniors. 3 s.h. (w) CHAMBERS

### HEALTH EDUCATION

132. SCHOOL HEALTH PROBLEMS.—A course designed (a) to familiarize the teacher with school health problems such as physical screening, communicable disease prevention and control, healthful school environment; (b) to present methods and materials for health teaching in elementary and secondary schools. 3 s.h. (w) FRIEDRICH

## WOMAN'S COLLEGE

PROFESSOR GROUT, CHAIRMAN; PROFESSOR LEWIS, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR EDDY, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSOR BOOKHOUT; ASSOCIATE PROFESSORS HOLTON AND UHRHANE; ASSISTANT PROFESSORS LLOYD, SPANGLER, WOODYARD, AND WRAY; INSTRUCTOR RAYNOR

A student must complete four semester hours of physical education in order to fulfill graduation requirements. Ordinarily work must be completed by the end of the sophomore year. Classes meet three times a week or the equivalent thereof.

Each semester is divided into halves. In general, indoor activities are taught during the two winter half-semesters and outdoor activities in the fall and spring.

Every student must take one course (half-semester) in dance and one in swimming if she is unable to pass the swimming test. The remaining work necessary to complete the requirement may be elected from the activities listed in this section.

All students are given a physical and medical examination upon entering and at any other time when deemed necessary. Classes in adapted physical education and light sports are arranged for those who should not take the more active work.

### HEALTH AND PHYSICAL EDUCATION

### SPECIAL FRESHMAN PHYSICAL EDUCATION

At the beginning of the year, after a series of tests has been given, each freshman is registered for the course she most needs, as determined by the test scores. Courses in sports fundamentals, fundamentals of rhythm, beginning swimming, and posture and movement are offered for those who need to improve their skills in these areas. Students whose test scores are satisfactory will enroll in classes with the sophomores.

After the first half-semester all freshmen and sophomores enroll in classes together.

### PHYSICAL EDUCATION ACTIVITIES

Individual and dual sports: archery, badminton, bowling, diving, fencing, golf, life saving, light sports, riding, stunts, tumbling, and apparatus, swimming, tennis, first aid, instructors' life saving, and water safety.

Team sports: basketball, hockey, softball, volley ball, "rec" ball.

Dance: dance, folk dance, modern dance, square dance, tap dance.

Developmental Activities: posture and movement, posture, fundamental rhythms, sports fundamentals, and conditioning exercises.

The courses listed in this section are open for credit as follows: P.E. 91, 101, 117, 119, 181-182, 185, Health Education 101-102 open only to students preparing to teach physical education, with the exception of 91 which is open for credit to students in the Elementary Teaching Program. Physical Education 105-106, 113, 114, and Health Education 131, 134, 140, and 170, are open to all undergraduate students, both men and women.

91. FIRST AID AND SAFETY IN PHYSICAL EDUCATION.—A study of measures which must be taken to insure maximum safety in physical education programs; principles and practices in the care and prevention of athletic injuries. 1 s.h. (E) MISS LLOYD

101. HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION.—A survey of the relationship between physical education and social, political, and religious ideals of different nations and periods. Principles upon which physical education is based. A study of the physical, emotional, and social development of children at different ages with implications for physical education. Analysis of successful teaching. 3 s.h. (E) MISS GROUT

102. THE TEACHING OF PHYSICAL EDUCATION IN ELEMENTARY SCHOOLS.—A study of methods and materials for teaching physical education to children. Discussion of principles of physical education and practice in teaching elementary school activities. Required of students in the elementary school teaching program. 2 s.h. (E) MISS LEWIS

105-106. METHODS AND MATERIALS IN RECREATION.—A course intended to familiarize students with recreation activities and methods of organizing groups in these activities. Recommended for students interested in camping, scouting, YWCA work, and religious education. Laboratory work includes practical leadership experience with a recreational club or group in a city organization. Fields covered are: Social Activities, Music Activities, Folk and Square Dancing, Games and Sports, Arts and Crafts, Drama Activities. Open to juniors and seniors without prerequisite. Students who have had 102 may take 106 without 105. 6 s.h. (E) MISS HOLTON

113. MAMMALIAN ANATOMY.—A study of all organ systems with special emphasis on osteology, arthrology and myology. The cat is used as laboratory animal, but constant application is made to man. Not open to students who have had Zoology 53. Prerequisite: Zoology 1 and 2. 4 s.h. (E) MRS. BOOKHOUT

114. KINESIOLOGY.—A study of muscle function. Analysis of fundamental movements with emphasis on the development of normal posture and efficient body movement. Required of students taking the major in physical education. Prerequisites: Zoology 1 and 2, and P.E. 113 or Zoology 53. 3 s.h. (E) MRS. BOOKHOUT

117. PHYSICAL FITNESS AND INDIVIDUAL PHYSICAL EDUCATION.—An analysis of exercises designed to improve physical fitness of groups and to meet individual needs for which specific exercises are indicated. Theory of teaching individual and group gymnastics. 2 s.h. (E) MRS. BOOKHOUT

119. ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Curriculum building in physical education. The administration of class and intramural programs. Administrative problems such as budget, equipment, facilities, interschool athletics, legal aspects, and public relations. 2 s.h. (E) MISS GROUT

120. EVALUATION AND MEASUREMENT IN PHYSICAL EDUCATION.—History of evaluation and measurement in physical education. Elementary statistics and application of statistical procedure in testing. Familiarity with athletic achievement tests for elementary and secondary schools, and with testing of sport techniques, rhythm, and general qualities of motor ability, motor capacity, and motor educability. 2 s.h. MRS. BOOKHOUT

181-182. METHODS AND MATERIALS IN PHYSICAL EDUCATION.—Includes basic theory and practice in teaching various types of dance, games, and

sports. Laboratory hours are arranged to provide practice on the field and in the gymnasium. 6 s.h. (E) MISS LEWIS AND STAFF

185. ADVANCED METHODS AND MATERIALS IN PHYSICAL EDUCATION.—A continuation of 181-182. Required of senior majors in physical education. 3 s.h. (E) MISS LEWIS AND STAFF

## HEALTH EDUCATION

101-102. HEALTH EDUCATION FUNDAMENTALS, METHODS, AND MATERIALS.—Designed specifically for and open only to physical education majors. Basic studies in personal and community health; administration; curriculum and program planning; health services and health counseling; selection, purchase, and care of equipment; library sources; methods and materials for effective health teaching; evaluation techniques and procedures. 6 s.h. (E) MISS UHRHANE

131. HEALTH PROBLEMS IN THE TWENTIETH CENTURY.—Examination of such topics as: mental health, use and abuse of alcohol and drugs; radiation hazards; atmospheric pollution; population explosion, mobility and migration; basic health and fitness; consumer evaluation and judgment in regard to health services, products and information. Open to sophomores. 3 s.h. (E) MISS UHRHANE

134. SCHOOL HEALTH.—Organization and administration of the school health program; basic health problems in schools; methods and materials for teaching health education. Primarily designed for students preparing to teach in elementary and secondary schools and for physical education majors. Open to juniors and seniors only. *Either semester.* 2 s.h. (E) MISS UHRHANE

140. GEREOLOGY AND HEALTH.—Designed to help the college age person understand and appreciate the health problems of aging. Topics to be considered will include: emotional health implications in the changing role of the aged in our society; housing plans, nursing homes and medical care; health problems related to the degenerative diseases, accident hazards; nutrition; and health implications of retirement and leisure time activities. Open to sophomores. 3 s.h. (E) MISS UHRHANE

170. SPECIAL HEALTH PROBLEMS.—This course emphasizes economic, cultural and physical interrelationships operative in the creation and solution of health problems in: housing and city planning, water and waste control, food production and distribution, world health; and the effects on well-being of: killing and crippling diseases, handicapping conditions, medical care, philanthropic giving. Open to juniors and seniors only. 3 s.h. (E) MISS UHRHANE

### REQUIREMENTS FOR TEACHING PHYSICAL EDUCATION AND HEALTH IN PUBLIC SCHOOLS

The following requirements have been set up for students in the Teaching Program who wish to qualify as full-time teachers of Physical Education and Health. The requirements meet the standards of the North Carolina Department of Public Instruction for certification in Physical Education and Health and of many of the other states represented in the student body. Students preparing to teach in any state are advised to consult the Department of Education about specific requirements.

*Prerequisites:* Physical Education 91 and 101. Zoology 1-2.

*Major Requirements:* 24 s.h. including Physical Education 114, 117, 119, 120, 181-182, 185, and Health Education 101-102.

*Related Work:* Sufficient work in subjects required for certification for teaching Physical Education and Health. Of these, 8 hours must be in anatomy and physiology (P.E. 113, Mammalian Anatomy, and Zoology 151, Principles of Physiology). For the remaining hours work done in the Department of Education leading to teacher certification is acceptable. Courses in health education, chemistry, zoology, sociology, psychology, art, music, and physical education are recommended.

# HINDI-URDU

181, 182. INTENSIVE ELEMENTARY HINDUSTANI.—Four hours of classroom work, two hours of language drill. Concentration on the acquisition of

conversational ability in Hindustani, with a grammar and vocabulary basic to both Hindi and Urdu. Introduction to the Devanagari script, and the reading of graded texts. 8 s.h. SWAN

183, 184. INTENSIVE INTERMEDIATE HINDUSTANI.—Four hours of classroom work, two hours of language drill. Advanced conversation in Hindustani. Reading and Composition. Introduction to the Nastaliq script. (Prerequisite: Elementary Hindustani.) 8 s.h. SWAN

HINDI 185, 186. ADVANCED HINDI READING AND COMPOSITION.—An introduction to scholarly and literary Hindi prose, and extensive practice in composition. Prerequisite: Hindustani 183, 184, or equivalent. 6 s.h. SWAN

These courses are offered as an enrichment program for students interested in the South Asian subcontinent and may be taken as general electives by advanced undergraduate students. No major work is offered in Hindi-Urdu.

## HISTORY

PROFESSOR WATSON, CHAIRMAN; PROFESSOR COLTON, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR ROPP, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS ALDEN, CRANE, CURTISS, FERGUSON, HAMILTON, HOLLEY, LANNING, MANCHESTER, NELSON, PARKER, AND WOODY; VISITING PROFESSORS BARNES, CLARK AND RAYCHAUDHURI; ASSOCIATE PROFESSORS ACOMB, DURDEN, HOLLYDAY, W. SCOTT, VAN AKEN, AND YOUNG; ASSISTANT PROFESSORS DAVIS, GILLIN, LERNER, AND A. SCOTT; INSTRUCTORS CELL, GINTER, WALL, WALLACE, AND WALTON; MR. HOHNER AND MR. ROLLER

The undergraduate courses in history are designed to afford (1) an introduction to the study of history by a consideration of the history of the modern world; (2) a more intensive study of general American history; (3) opportunities for more advanced study of phases of American, English, European, Hispanic-American, Russian, and Asian history.

Course 1-2 or 51-52 or the equivalent is a prerequisite for all other courses; courses 91 and 92 are prerequisite for all 100 and 200 courses in United States history. However, seniors with written permission from the instructor may take advanced American history courses without having had 91 and 92. Sophomores who took only one semester of course 1-2 in the freshman year may take courses 91, 92, 95, 96 or 99 concurrently with the second semester, provided they made a grade of B or above on the semester taken. Sophomores must obtain permission of the instructor in order to be admitted to courses numbered above 100; students who are not fully qualified sophomores will not be admitted to these courses. Courses for seniors and graduates are limited to twenty-five students; juniors may not elect them without special permission from the Department and the Executive Committee of the Graduate Faculty.

1, 2. MODERN HISTORY.—This course is an introduction to the study of modern history with special reference to the issues in the modern world. Topics selected for emphasis are: the contest between liberty and authority in the modern state; changing economic organization and theory—capitalism and the challenges to it; the problems of peace and war among the states; the changing faiths men live and die by. Beginning about 1500 with the rise of the European dynastic states, the story is pursued in the first semester to approximately 1848, and in the second through the two great world wars. The central theme in both semesters is the expansion of the influence of Western Europe throughout the world, with some attention to the rise of the United States as a world power. 6 s.h. (E & W)

Sophomores and juniors are not admitted to this course.

FERGUSON AND ROPP; MISS ACOMB, HOLLYDAY, AND YOUNG; GILLIN AND LERNER; CELL, GINTER, WALL, WALLACE, AND WALTON

51, 52. MODERN HISTORY.—An introductory course for sophomores, juniors, and seniors dealing with the topics indicated in the description of course 1-2. 6 s.h. (E & W) PARKER; MISS ACOMB, HOLLYDAY, SCOTT, AND YOUNG; CELL AND GINTER

51X, 52X. MODERN HISTORY.—A special section for seniors who have had

no other history at Duke. The topics covered will be essentially the same as those indicated in the description of History 1-2. 6 s.h. (W) ROPP

91. THE DEVELOPMENT OF AMERICAN DEMOCRACY TO 1865.—This course is a study of the trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social behavior, and conflicting ideals are considered in relation to this main theme. 3 s.h. (E & W)

HOLLEY; DURDEN; DAVIS AND MRS. A. SCOTT; HOHNER, ROLLER, AND WALL

92. THE DEVELOPMENT OF AMERICAN DEMOCRACY, 1865 TO THE PRESENT.—A continuation of History 91 with emphasis upon the emergence of contemporary problems. 3 s.h. (E & W)

HOLLEY; DURDEN; DAVIS AND MRS. A. SCOTT; HOHNER, ROLLER, AND WALL

Courses 91 and 92 are intended both to serve as continuation courses in the study of history and to afford the student an opportunity to gain the understanding of the past of the United States essential for intelligent citizenship. These courses are prerequisite for all 100 and 200 courses in United States history, but this prerequisite may be waived for seniors by written permission of the instructor.

95, 96. ANCIENT AND MEDIEVAL HISTORY.—An introductory study of the history of mankind from preliterate man through the development of the characteristic institutions of Western Europe. The first semester considers the prehistoric tribes, the early cultures of Mesopotamia and Egypt, the religious contribution of the Hebrews, and classical Greece and Rome. The second semester deals with Europe in the Middle Ages, from Constantine to Columbus, with emphasis upon institutional and cultural development. 6 s.h. (E) YOUNG

99. NAVAL HISTORY AND ELEMENTARY STRATEGY.—After a review of earlier periods, attention is given to the rise of sea-power and its importance in more recent times and to naval actions, especially in the two World Wars. This course is not open to students who have had N.S. 102. 3 s.h. (W) ROPP

105, 106. POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND.—The origins and evolution of the principal institutions of the English government, related to their setting in a changing society. 6 s.h. (W) HAMILTON

107, 108. SOCIAL AND CULTURAL HISTORY OF ENGLAND.— A study of English history from the fourteenth century to the present time in an effort to arrive at a synthesis of social and political events and thus provide a background for the study of English literature. Emphasis is placed on the ages of Chaucer, Shakespeare, and Milton; the eighteenth and early nineteenth centuries; the reign of Victoria and the twentieth century. 6 s.h. (E) FERGUSON

*Sophomores who made an average grade of B or above on course 1-2 may be admitted to this course.*

109, 110. HISTORY OF ROME.—A survey of the history of the Roman State from its beginnings to the death of Justinian; its expansion; development of its constitution and public administration; social, legal, political and economic problems of perennial life and interest; the background and setting of Christianity's rise and growth. (This course carries no language credit. No knowledge of Latin is required for admission.) 6 s.h. (E) ROGERS

111, 112. AMERICA IN THE COLONIAL AND EARLY MODERN ERA.—Lectures upon the history of America from the discovery to the beginning of the Civil War. They will be primarily concerned with things political, institutional, and social, with occasional discussions of intellectual and cultural advance. 6 s.h. ALDEN

113, 114. AMERICA IN THE TWENTIETH CENTURY.—A historical survey of political, economic, and social problems of twentieth-century United States. Emphasis is placed on reform movements from the Muckrakers through the Fair Deal, the emergence of the United States as a world power, and conflicting ideas and ideologies. 6 s.h. (W) WATSON

121, 122. FOREIGN RELATIONS OF THE UNITED STATES, 1775 TO THE PRESENT (first semester to 1898).—With emphasis on social and economic currents as well as on diplomacy. 6 s.h. (W) DAVIS

123. CITY AND FRONTIER IN AMERICAN HISTORY 1607-1880.—The westward movement and the progress of urbanization with special attention to the social and political consequences. 3 s.h. (E) MRS. A. SCOTT

124. CITY AND FRONTIER IN AMERICAN HISTORY 1880 TO THE PRESENT.—A continuation of History 123 covering the later movement to the West and the urbanization of the post Civil War period. 3 s.h. (E) MRS. A. SCOTT

127. HISTORY OF LATIN AMERICA THROUGH THE FORMATION OF THE NATIONAL GOVERNMENTS.—3 s.h. (W) LANNING AND VAN AKEN

128. INTER-AMERICAN AFFAIRS.—This course treats the relations of the Latin-American states with each other and with the United States with the design of explaining the current significance of Latin America. Chief emphasis is placed upon social problems and movements common to all the republics and upon the role of the United States in Latin-American affairs, including such topics as American intervention; contributions of the United States to Latin-American life in such matters as public health; Pan-Americanism; Pan-Hispanism; foreign penetration and ideologies; the cultural and commercial aspects of the Good Neighbor Policy; Latin-American states in the World Wars. 3 s.h. (W) LANNING

131, 132. THE DEVELOPMENT OF THE MAJOR SOUTH AMERICAN POWERS.—Political, social, and economic history of Argentina, Brazil, and Chile since independence. First semester to 1890; second semester to the present day. 6 s.h. VAN AKEN

135, 136. EUROPE IN THE TWENTIETH CENTURY.—Political, economic, and intellectual developments in Europe since 1900. First semester to 1933; second semester to the present day. 6 s.h. (W) COLTON

137, 138. FOREIGN RELATIONS OF THE EUROPEAN POWERS.—European diplomacy and Europe's position in the world since 1870, with an introductory survey of diplomatic institutions since the Renaissance. 6 s.h. (W) W. SCOTT

139, 140. NINETEENTH-CENTURY EUROPE.—With special attention to Germany and Austria-Hungary, this course will emphasize the development of European nationalism and the clash of freedom and authority. 6 s.h. (W) HOLLYDAY

141, 142. CHINA AND JAPAN IN MODERN TIMES.—A history of their response to the West between 1750 and the present, with some attention to their cultural background. 6 s.h. GILLIN

147. THE HISTORY OF INDIA TO 1757: A SURVEY.—The history of the Indian sub-continent; classical Hindu civilization; the coming of Islam; the Mughal Empire; European penetration and rivalries; the establishment of British supremacy. 3 s.h. (W) CRANE

148. THE HISTORY OF INDIA, 1757 TO THE PRESENT: A SURVEY.—The East India Company; British impact; the Indian Mutiny; the nature and effects of Crown Rule; Indian nationalism; Muslim nationalism; the Gandhian Era; the transfer of power; partition and independence; the contemporary scene. 3 s.h. (W) CRANE

153, 154. THE HISTORY OF THE SOUTH.—A study, beginning in the Colonial period, of the development of the Southern part of the United States with particular attention to its distinctive characteristics and institutions and to their influence in shaping Southern attitudes toward major questions of national policy. 6 s.h. (W) WOODY

157, 158. THE RISE OF MODERN SCIENCE.—A historical survey of the development of scientific ideas. First semester, Copernicus through the Age of Newton; second semester, the science of the nineteenth and twentieth centuries. 6 s.h. WALLACE

161, 162. RUSSIA FROM IVAN THE TERRIBLE TO PRESENT TIMES.—Topics treated include the rise of the Russian state and its relations with Poland and Turkey; the agrarian problem and the rise of industry; the Russian Revolution; the political, agricultural and industrial policies of the Soviet Union; the role of the U.S.S.R. in World War II; and its postwar policies. 6 s.h. (W) CURTISS AND LERNER

163, 164. REFORM AND POLITICS IN NINETEENTH CENTURY AMERICA.—First semester: the coming of the Civil War with emphasis on the reform movements of the Jackson era, and anti-slavery crusade and national politics to 1865. Second semester: reform and politics from the Reconstruction era to the Farmers' Revolt of the 1890's. 6 s.h. (w) DURDEN

FOR SENIORS AND GRADUATES

Students may receive credit for either semester of a hyphenated course at the 200-level without taking the other semester if they obtain written permission from the instructor and either the Director of Undergraduate or the Director of Graduate Studies.

201-202. THE HISTORY OF RUSSIA, 1801-1917.—The development of the Russian Empire in its political, social, and economic aspects, and the growth of forces leading to its downfall. 6 s.h. CURTISS

203-204. THE UNITED STATES, 1850-1900.—The rise of sectionalism, secession, war-time problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform, the Spanish-American War. 6 s.h. (w) WOODY

205-206. THE UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administrations. (Not open to students who have had History 113.) 6 s.h. (w) WATSON

208. ECONOMIC HISTORY OF MODERN INDIA.—A historical study of the development of the Indian economy in the 19th and 20th centuries with special emphasis on structural and institutional changes. 3 s.h. RAYCHAUDHURI

212. RECENT INTERPRETATIONS OF UNITED STATES HISTORY.—A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. 3 s.h. (w) WATSON

*Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.*

213-214. THE OLD SOUTH.—Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufacturing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 s.h. (w) WOODY

215-216. THE DIPLOMATIC HISTORY OF THE UNITED STATES.—A study of the history of American diplomacy, with particular emphasis on those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 s.h. (w) DAVIS

221-222. THE AGE OF THE RENAISSANCE.—The decline of characteristic features of medieval civilization and the rise of modern European institutions with particular attention to intellectual movements from Dante to Erasmus. 6 s.h. (e) NELSON

223-224. THE OLD REGIME AND THE FRENCH REVOLUTION, 1661-1815.—A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 s.h. MISS ACOMB

225-226. THE AGE OF THE REFORMATION.—A survey of European civilization from 1500 through the Peace of Westphalia. 6 s.h. (e). NELSON

227, 228. EUROPE IN THE NINETEENTH CENTURY.—A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 s.h. (w) PARKER

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 3 s.h. PARKER

*Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.*

231-232. THE HISPANIC COLONIES AND REPUBLICS IN AMERICA.—6 s.h. (w) LANNING

233-234. THE INSTITUTIONAL, CULTURAL, AND SOCIAL HISTORY OF HISPANIC AMERICA.—The first semester deals with the culture, society, and institutions of the Spanish colonies in America and the second semester with those of the Hispanic American republics. 6 s.h. (w) LANNING

235, 236. EUROPEAN EXPANSION OVERSEAS (1415-1898).—A course dealing primarily with the processes by which European institutions were carried overseas and modified in a new environment. In the first semester the emphasis is on Portuguese, Dutch, French, and English experience in the Far East and the Americas to 1763. In the second semester, attention is paid to the emergence of independent centers of European culture, as in Brazil, and to the revivals of mercantile imperialism of the new German, French, Italian and British empires of the nineteenth century. 6 s.h. (w) MANCHESTER

237-238. EUROPE IN THE MIDDLE AGES, 395-1500.—Attention is given both to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 s.h. YOUNG

241-242. NATIONALISM AND COMMUNISM IN THE FAR EAST.—The growth of nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 s.h. GILLIN

245-246. WAR IN THE MODERN WORLD.—This course is concerned with the relations between warfare and modern political, economic, and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 s.h. (w) ROPP

247. THE HISTORY OF MODERN INDIA, 1757-1857.—Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 s.h. (w) CRANE

248. THE HISTORY OF MODERN INDIA AND PAKISTAN, 1857-1947.—Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 s.h. (w) CRANE

249-250. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—The interplay of ideas and social practice through the examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 s.h. (w) HOLLEY

251-252. RECENT EUROPEAN HISTORY.—A history of political and economic developments in Western Europe since 1870. 6 s.h. (w) COLTON

*Not open to students who have had 135, 136.*

259-260. THE EMERGENCE OF THE NEW SOUTH, 1865 TO THE PRESENT.—Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 s.h. DURDEN

261-262. RUSSIA SINCE 1917.—A study of the background of the Revolution of 1917 followed by an analysis of the history and policies of the Soviet state. 6 s.h. (w)
*Not open to students who have had 161-162.* Curtiss and Lerner

263-264. AMERICAN COLONIAL HISTORY AND THE REVOLUTION, 1607-1789.—The founding and institutional development of the English colonies; the background, progress, and results of the Revolution. 6 s.h. (w) Alden

267, 268. FROM MEDIEVAL TO EARLY MODERN ENGLAND.—The intellectual, social, and political problems of transition to modern England, with special emphasis on the English Renaissance. 6 s.h. (w) Ferguson
*Not open to students who have had 107.*

269. BRITISH HISTORY FROM 1714 TO 1867.—The interrelationship of the leadership of such men as Walpole, Chatham, Pitt, and Peel with war, revolution, and social institutions; the rise of the cabinet system; the Industrial Revolution; imperial changes; and reform. 3 s.h. (w) Hamilton

270. GREAT BRITAIN AND THE COMMONWEALTH OF NATIONS, 1867 TO THE PRESENT.—A history of Great Britain at the height of her world dominance and beyond, her oceanic empire, and the evolution of that empire into a unique world-wide Commonwealth of Nations. 3 s.h. (w) Hamilton

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the formation of the classical civilization of the Indian sub-continent from the prehistoric Indus Age to the Gupta Period (4th century A.D.). Attention will be given to the development of political, economic, social and religious movements and institutions. 3 s.h. [Listed also in the Department of Religion] Sullivan

297. THE BRITISH EMPIRE IN THE NINETEENTH CENTURY (FROM 1783).—3 s.h. (w)

298. THE COMMONWEALTH IN THE TWENTIETH CENTURY.—3 s.h. (w)

## INDEPENDENT STUDY

191, 192. INDEPENDENT STUDY.—Designed to permit superior students to pursue individual research and reading under the supervision of a member of the staff. Open only to juniors with a B average in History and in their over-all work. Normally such students would be candidates for graduation with distinction. Admission will be subject to approval of the individual instructor and of the Director of Undergraduate Studies of the Department of History. 6 s.h. Staff

193, 194. INDEPENDENT STUDY.—Same as 191, 192, but for seniors. 6 or 12 s.h. Staff

## UNDERGRADUATE SEMINARS

*Prerequisites:* History 1, 2 (or 51, 52) and History 91, 92 (except for History 195A-196A) and the consent of the instructor.

The following seminars are designed to offer opportunities for reading and historical investigation in significant problems. Juniors as well as seniors may apply for admission to these courses, and are urged to do so if they expect to be candidates for graduation with distinction in history or if they expect to practice-teach in their senior year. All seminars are open to non-majors as well as to majors.

195A-196A. THE BACKGROUND OF MODERN EUROPEAN CIVILIZATION.—Topics in intellectual-cultural history of Europe and adjacent areas from the earliest records to 1648. The work aims to develop critical appreciation and maturity of judgment through using primary sources. 6 s.h. (E) Nelson

195B-196B. SEMINAR IN TWENTIETH-CENTURY EUROPE.—6 s.h. (w)
*Students may not receive credit for this course and 251-252.* Colton

195C-196C. PROBLEMS IN AMERICAN INTELLECTUAL HISTORY.—6 s.h. (w) Holley
*Students may not receive credit for this course and 249-250.*

195D-196D. THE PROGRESSIVE ERA THROUGH THE NEW DEAL.—6 s.h. (w) Watson

195E-196E. SEMINAR IN AMERICAN HISTORY BEFORE 1789.—6 s.h. (w) ALDEN

195F-196F. PROBLEMS IN NINETEENTH CENTURY AMERICAN REFORM AND POLITICS.—6 s.h. DURDEN

*Students may not receive credit for this course and 163-164*

195G-196G. NATIONALISM AND COMMUNISM IN THE FAR EAST.—This course will combine general reading and discussion with occasional lectures and specialized research on the events and forces underlying developments in China, Japan, and other Far Eastern areas during the 19th and 20th centuries. 6 s.h. GILLIN

195H-196H. FROM RURAL TO URBAN SOCIETY IN THE UNITED STATES.—6 s.h. MRS. A. SCOTT

195I-196I. NATIONALISM AND FREEDOM IN NINETEENTH CENTURY EUROPE.—6 s.h. HOLLYDAY

195J-196J. THE HISTORY OF INTERNATIONAL SOCIALISM AND COMMUNISM.—International Socialist and Communist movements from Utopian Socialism to the present. 6 s.h. LERNER

197-198. SENIOR HONORS SEMINAR.—A course designed to introduce qualified students to advanced methods of historical research and writing and to the appraisal of critical historical issues. Open only to seniors, but not restricted to candidates for degree with distinction. This course, when taken by a history major, would be in addition to the 6 semester hours required in 195-196 seminars or 200-level courses of the History Department. 6 s.h. HOLLEY AND PARKER

## DEPARTMENTAL MAJOR

*Prerequisite:* The Introductory Course in History (1-2 or 51-52).

*Major Requirements:* Students desiring to take a major in history are required to elect, in addition to History 1-2 or 51-52, 24 semester hours in the Department, including six semester hours in either an undergraduate seminar (195-196) or any course in the 200 group. Students are urged to take History 91-92; in any case those wishing to take the more advanced courses in American history should elect History 91-92 in the sophomore or junior year.

*Honors:* Any student who is qualified (see the section on Honors in this *Bulletin* for general requirements) may undertake work leading to a degree with distinction in History by presenting himself to his History faculty advisor as a candidate. Normally, Honors work involves participation in one of the Undergraduate Seminars during the junior year and selection for the Senior Honors Seminar in the senior year.

## COURSES APPROVED FOR RELATED WORK IN HISTORY

Art; History of Art
Economics, but not the courses listed under business administration and accounting except those in economic geography
Education, 54, 104, 225
English and American literature, but not composition, speech, and drama (except 119)
German, Greek, Latin, Russian, and the Romance Languages: the literature courses numbered 100 or above that are not primarily conversation or composition courses
Greek, Latin, except those courses that are primarily grammar or composition
Linguistics, 101
Music; History of Music
Philosophy, except 48
Political Science
Psychology, 91, 100, 101
Religion, especially those numbered above 100
Sociology

## HONORS-MASTERS PROGRAM

For a brief description of this program see page 37 of this *Bulletin*.

COLLOQUIUM 101, 102. THE UNIVERSITY AND THE SCHOLAR.—Selected readings and informal discussions about such topics as the role of universities and teacher-scholars, the history of Duke University, the art of teaching, academic freedom, scholarly writing, and other related matters. 2 s.h.

## LINGUISTICS

The courses in Linguistics may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major is offered in Linguistics. Students interested in the study of language as a part of their undergraduate program or as a preparation for graduate work in linguistics should consult the instructors of the courses listed below.

101. INTRODUCTION TO LINGUISTICS.—Origin and nature of language, methods of descriptive linguistics with reference to historical and comparative linguistics. No specific prerequisite. Sophomore standing. 3 s.h. SEYMOUR

For a description of the following courses consult the listings under the specified department.

DEVELOPMENT OF THE ENGLISH LANGUAGE (English 161)
MODERN ENGLISH GRAMMAR (English 162) CLOGAN
OLD ENGLISH GRAMMAR AND READINGS (English 207) LUMIANSKY AND NYGARD
HISTORY OF THE ENGLISH LANGUAGE (English 208) LUMIANSKY AND NYGARD
OLD FRENCH LITERATURE (French 219) VINCENT
MIDDLE HIGH GERMAN (German 205, 206) SEYMOUR
HISTORY OF THE GERMAN LANGUAGE (German 216) SEYMOUR
PHILOSOPHY OF LANGUAGE (Philosophy 109) WELSH
ROMANCE LINGUISTICS (Romance Languages 224) HULL
CULTURAL ANTHROPOLOGY (Sociology 94) LABARRE
OLD SPANISH LANGUAGE (Spanish 257) DAVIS

## MATHEMATICS

PROFESSOR GERGEN, CHAIRMAN; PROFESSOR DRESSEL, ACTING CHAIRMAN; ASSISTANT PROFESSOR HARE, ACTING DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR HICKSON, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS CARLITZ, ELLIOTT, MURRAY, ROBERTS, AND THOMAS; ASSOCIATE PROFESSORS GALLIE, REYNOLDS, SHOENFIELD, AND WARNER; ASSISTANT PROFESSORS BRYSON, BURDICK, DEAN, HARRIS, HINRICHS, KELINGOS, KITCHEN, SCOVILLE, SMITH, AND STACKELBERG; MESSRS. ADAMS, AMBROSE, BEWICK, CAIRNS, ENTWHISTLE, FARMER, GORDON, KELLY, LOCKSLEY, RATCLIFFE, SCHORR, TOKAZ, TURNER, WILD, AND WILTRAKIS

The following program of courses in Mathematics is planned for 1964-65. Fall: 11, 17, 21, 22, 41, 63, 64, 83, 111, 113, 135, 139, 141, 217, 221, 227, 233, 235, 247, 271, 283, 285, 291. Spring: 18, 21, 22, 42, 63, 64, 84, 112, 114, 131, 136, 140, 142, 218, 221, 222, 228, 234, 236, 248, 272, 286, 292.

11. ALGEBRA AND TRIGONOMETRY.—Factoring, fractions, linear equations in one or several unknowns, introduction to coordinates and graphing, exponents and radicals, numerical trigonometry. Prerequisite: two units of college preparatory mathematics. 3 s.h. (E & W) STAFF

17. INTRODUCTION TO FINITE MATHEMATICS.—A course designed to introduce students to some of the concepts in modern mathematics. Elementary logic, sets and subsets, vectors and matrices, and probability theory are studied.

Some applications of these topics to the biological, social, and physical sciences are considered. Prerequisite: two and one-half units of college preparatory mathematics. 3 s.h. (w) STAFF

18. ELEMENTARY STATISTICS.—An introduction to statistics with emphasis on fundamental concepts. Topics studied include summarization of data, mean and standard deviation, normal, binomial and other distributions, sampling, statistical estimation, and testing hypotheses. Prerequisites: Mathematics 17. 3 s.h. (w) STAFF

21, 22. INTRODUCTORY CALCULUS.—Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: two and one-half units of college preparatory mathematics. Mathematics 21 is prerequisite for Mathematics 22. 6 s.h. (E & W) STAFF

41, 42. INTRODUCTORY CALCULUS.—A special course covering the topics of Mathematics 21, 22 in a more extensive and rigorous fashion, designed for students who have demonstrated marked proficiency in mathematics. Credit for this course and Mathematics 21, 22 is not allowed. Prerequisite: four units of college preparatory mathematics. 6 s.h. (w) STAFF

63, 64. INTERMEDIATE CALCULUS.—Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 22 for 63; and 63 for 64. 6 s.h. (w) STAFF

83, 84. INTERMEDIATE CALCULUS.—A continuation of Mathematics 41, 42, with coverage including the topics of Mathematics 63, 64 and related basic topics in mathematics. Credit for this course and Mathematics 63, 64 is not allowed. Prerequisite: Mathematics 42 for 83; and 83 for 84; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (w) STAFF

111. APPLIED MATHEMATICAL ANALYSIS I.—Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Mathematics 131. Prerequisite: Mathematics 64. 3 s.h. (w) STAFF

112. APPLIED MATHEMATICAL ANALYSIS II.—Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Mathematics 64. 3 s.h. (w) STAFF

113, 114. MODERN ALGEBRA.—Vector spaces, linear transformations, matrices, elementary theory of groups, rings, and fields. Prerequisite: Mathematics 63 for 113; and 113 for 114. 6 s.h. (w) HINRICHS

131. ELEMENTARY DIFFERENTIAL EQUATIONS.—Solution of differential equations of elementary types; formation and integration of equations arising in applications. Not open to students who have had Mathematics 111. Prerequisite: Mathematics 63. 3 s.h. (w) STAFF

135, 136. PROBABILITY AND STATISTICS.—Permutations and combinations, total and compound probability, Bayes' formula, Bernoulli's theorem, discrete distributions, central values, moments and mathematical expectation, law of large numbers, probabilities in continuum, continuous distributions, sampling distributions, confidence limits, tests of hypotheses, and analysis of variance. Prerequisite: Mathematics 63 for 135; and 135 for 136. 6 s.h. (w) BURDICK

139, 140. ADVANCED CALCULUS.—Multiple integrals and Jacobians, infinite series, power series, differential equations, vector analysis, line and surface integrals, Green's theorem, Stoke's theorem, improper integrals. Prerequisite: Mathematics 64 for 139; and 139 for 140. 6 s.h. (w) ELLIOTT

141, 142. JUNIOR MATHEMATICS SEMINAR.—An honors course designed to coordinate and advance the mathematical knowledge of students who have demonstrated marked proficiency in mathematics and who desire intensive and rigorous

work in this subject. Student reports will be required. Prerequisite: Mathematics 84 for 141; and 141 for 142; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (w) KITCHEN

183, 184. SENIOR MATHEMATICS SEMINAR.—An honors course continuing the work in Mathematics 141, 142, designed primarily for seniors. Prerequisites: Mathematics 141 and 142 for 183; and 183 for 184. Mathematics 183 and 184 must be preceded or accompanied respectively by Mathematics 217 and 218. 6 s.h. (w) KITCHEN

FOR SENIORS AND GRADUATES

204. GEOMETRY FOR TEACHERS.—The metric and synthetic approaches to plane and solid geometry are investigated. Affine geometry and an algebraic model of Euclidean geometry are discussed. 3 s.h.

213, 214. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations. 3 s.h. DRESSEL

217, 218. ANALYSIS.—Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 s.h. (w) KELINGOS

221. DIGITAL COMPUTER.—History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 22. 3 s.h. (w) SCOVILLE

222. INTRODUCTION TO NUMERICAL ANALYSIS.—Introduction to numerical analysis, error analysis, real and complex roots of equations, finite difference methods and theory of interpolation, numerical differentiation and integration, numerical integration of ordinary and partial differential equations, simultaneous equations and matrix inversion. Prerequisite: Mathematics 64 and 221. 3 s.h. (w) GALLIE

227, 228. THEORY OF NUMBERS.—Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums of squares. Prerequisite: Mathematics 64 for 227; and 227 for 228. 6 s.h. (w) CARLITZ

229, 230. ALGEBRAIC NUMBERS.—Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: Mathematics 113 for 229; and 229 for 230. 6 s.h. (w) CARLITZ

233. STATISTICAL METHODS.—Parameter estimation and hypothesis testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 s.h. (w) BRYSON

234. SAMPLE DESIGNS.—Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 s.h. (w) BRYSON

235, 236. ABSTRACT ALGEBRA.—Groups, fields, rings, matrices, quadratic and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: Mathematics 64 for 235; and 235 for 236. 6 s.h. (w) WARNER

244. DESIGN OF EXPERIMENTS.—Methods of constructing and analyzing designs for experimental investigation, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 s.h. (w) BURDICK

247, 248. ARITHMETIC OF POLYNOMIALS.—Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 235 or consent of the instructor for 247; and 247 for 248. 6 s.h. (w) CARLITZ

253, 254. DIFFERENTIAL GEOMETRY.—Curves and surfaces in three dimensional Euclidean Space, applicability, differential parameters, Riemannian geometry of n-space. Prerequisite: Mathematics 64 for 253; and 253 for 254. 6 s.h. (w) THOMAS

271, 272. INTRODUCTORY TOPOLOGY.—Topological properties of Euclidean spaces, set-theoretic and combinatorial methods. Prerequisite: Mathematics 64 for 271; and 271 for 272. 6 s.h. (w) ROBERTS

283. PROBABILITY FOR ENGINEERS.—Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: Mathematics 64. 3 s.h. (w) BURDICK

285. APPLIED MATHEMATICAL METHODS I.—Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 s.h. (w) DRESSEL

286. APPLIED MATHEMATICAL METHODS II.—Wave equation, Fourier series, heat equation, telegraphic equations, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Mathematics 64. 3 s.h. (w) DRESSEL

287, 288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 64, or consent of instructor for 287; and 287 for 288. 6 s.h. (w) SHOENFIELD

291, 292. THEORY OF FUNCTIONS.—Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: Mathematics 64 for 291; and 291 for 292. 6 s.h. (w) DEAN

### DEPARTMENTAL MAJOR

For the A.B. degree:

*Prerequisite:* Mathematics 21, 22.

*Major and Related Work:* 42 semester hours.

*Major Requirements:* Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

*Related Work:* 18-24 semester hours of course work from the following departments: chemistry, economics and business administration, philosophy, physics. Two courses above the introductory level must be taken in at least one of these departments.

For the B.S. degree:

*Prerequisite:* Mathematics 21, 22.

*Major and Related Work:* 48 semester hours.

*Major Requirements:* Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

*Related Work:* 14-24 semester hours of course work in the natural sciences. Two courses above the introductory level must be taken in at least one of these departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

## MEDICAL SCIENCE

This course in medical science has been approved by the Faculty Council as appropriate for the Bachelor's degree.

M201. ANATOMY AS RELATED TO LOCOMOTION.—The part of the body concerned with locomotion and posture will be dissected completely, whereas the thoracic, abdominal and pelvic organs, and the deeper structures of the head will be taught by means of audio-visual aids and prosections. September to January. Prerequisites: One year each of biology, chemistry, and physics. 6 s.h.

MARKEE AND EVERETT; BECKER AND DUKE

# MUSIC

PROFESSOR BONE, CHAIRMAN; ASSOCIATE PROFESSOR WITHERS, DIRECTOR OF UNDERGRADUATE STUDIES; VISITING PROFESSOR HAMILTON; ASSOCIATE PROFESSORS BRYAN, HANKS, KLENZ, MUELLER, AND SAVILLE; ASSISTANT PROFESSOR HENDRIX; VISITING ARTISTS LESHIN, B. PEPPER, AND J. PEPPER; VISITING LECTURER TREVARTHEN; INSTRUCTORS FISHBAUGH, FRIEDBERG, AND HENRY; MMES. CUSHMAN AND MCCALL

Courses in music are offered both for the general student who wishes to acquire knowledge of music as literature and, on a more technical level, for those prepared to major in the field. The courses marked * are open to general students without prerequisite.

## THEORY AND COMPOSITION

*55-56. BASIC MUSICIANSHIP.—Principles of tonal organization—notation, key, scale, interval, triad, meter, rhythm—experienced through practical applications of solfeggio, aural analysis and performance techniques. Recommended for general students who are engaged in choral and instrumental activities and for those students who wish to develop a basic technical foundation. One lecture, two laboratory hours, throughout the year. 4 s.h. (E) BRYAN

65-66. MUSIC THEORY I. *Harmony and Theory of Music.*—Manipulation and analysis of melodic, harmonic, rhythmic, contrapuntal and formal principles of tonal organization through written exercises, ear training, sightsinging and keyboard harmony. Three lectures, two laboratory hours throughout the year. 8 s.h. (E) BRYAN, FISHBAUGH, AND TREVARTHEN

115-116. MUSIC THEORY II. *Advanced Harmony and Counterpoint.*—First semester, exercises in advanced harmonic techniques and studies in formal analysis; second semester, emphasis on contrapuntal techniques and writing in the smaller forms. Prerequisite: Music 65-66. Two lectures; two laboratory hours throughout the year. 6 s.h. (E) BRYAN, FISHBAUGH, AND TREVARTHEN

Formerly 73-74.

117, 118. MUSIC THEORY. III. *Composition and Analysis.*—The development of technical and expressive means in various media and styles through practical exercises in composition and analysis of larger forms. The completion of an original work in an instrumental or choral medium. Prerequisite: Music 115-116 or consent of the instructor. 4 s.h. (E) HAMILTON

121. CONDUCTING.—The conducting of orchestral and vocal scores. Score-reading and analysis, principles of interpretation, establishment of vocal and instrumental conductoral techniques leading to practical experience in conducting the department musical organizations in rehearsal. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) BONE

122. ORCHESTRATION.—A study of the technical characteristics and transpositions of the instruments of the modern symphony orchestra and concert band. Instrumentation of piano scores of original compositions for string, woodwind, brass ensembles, and for full symphony orchestra or concert band. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) BRYAN

## HISTORY AND LITERATURE

*1-2. INTRODUCTION TO MUSIC LITERATURE.—Rhythm, melody, harmony, form, instruments of the orchestra as principal elements of an effective listening technique. Selected works representing major composers of the Baroque, Classic, Romantic, and Contemporary periods are approached through the several performance media of song, orchestra, piano, chamber music, opera. Open only to freshmen; others, see Music 51-52 and 51X-52X. 6 s.h. (E) HENRY

*51-52. INTRODUCTION TO MUSIC LITERATURE.—The aims of this course are identical with those of Music 1-2; the content and method are adapted to the capacities of upperclassmen. Open only to upperclassmen who have not completed Music 1-2. 6 s.h. (E) STAFF

*51X-52X. INTRODUCTION TO MUSIC LITERATURE.—A special section for music majors and advanced general students. The course sequence will be essentially the same as that of Music 1-2. 6 s.h. (E) TREVARTHEN

*125. MASTERWORKS OF MUSIC LITERATURE.—An intensive study of selected masterworks which represent the principal currents in modern music history. Compositions by Bach, Mozart, Beethoven, Brahms, Debussy and Bartok will constitute a frame of reference for historical, biographical and stylistic analysis. 3 s.h. (E) HAMILTON AND MUELLER

133. ORCHESTRAL LITERATURE.—A study of orchestral suites, overtures, concerti, symphonies, and symphonic poems selected from literature of the eighteenth century to the present. Prerequisite: a one-year course in Music Theory or Literature, or concent of the instructor. 3 s.h. (E) BONE

*134. CHORAL LITERATURE.—A study of great choral works from the Renaissance to the present. The development of the mass, motet, cantata, oratorio, and passion, with attention to changing aesthetic and religious concepts as well as to formal and stylistic means. Intensive study of complete scores of composers selected from palestrina to Stravinsky; individual projects. 3 s.h. (E) SAVILLE

135. PIANO LITERATURE.—A survey of the great works for keyboard instruments, from the time of the English virginal composers to the present. Prerequisites: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) WITHERS

136. SOLO SONG LITERATURE.—A study of selected standard repertoire: early Italian and English songs, German lieder; the French, English and American art song and the standard operatic aria. Open to voice students and others by consent of the instructor. 3 s.h. (E) HANKS

137. CHAMBER MUSIC.—An analytic study of representative masterpieces of the chamber music repertoire with emphasis upon the Classic Quartet literature. Prerequisite: a one-year course in Music Theory or Literature, or consent of the instructor. 3 s.h. (E) MUELLER

139. TWENTIETH CENTURY MUSIC.—The course will trace the most influential creative stylistic developments in music of the present century. A critical survey will emphasize works by key figures Bartok, Berg, Schonberg, and Stravinsky as a means of establishing a relative standard of values for subsequent independent exploration. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 3 s.h. (E) HAMILTON

141. BEETHOVEN: AN ANALYSIS OF THE CLASSICAL SYSTEM.—Selected major works showing Beethoven's treatment of the orchestra, piano and opera. Inquiry will be made into the total concept of the great classical tradition which finds its culmination in this composer's work. Detailed structural and harmonic analysis will be stressed. Prerequisites: Music 65-66, 115-116. 3 s.h. (E) HAMILTON

147-148. HISTORY OF MUSIC.—The history of the development of music as a manifestation of Western culture from mediaeval to modern times. The rise of Christianity through the Renaissance, first semester; the Baroque to the present, second semester. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 6 s.h. (E) SAVILLE AND KLENZ

149. ORGAN LITERATURE.—A survey of the great works for organ from Bach to the present day. Interpretive analysis illustrated through performance whenever practicable. Attention will be given to problems of registration and style relating to the technical capacities of organ construction in each period studied. Emphasis on J. S. Bach, 19th century French and contemporary organ works. Open to organ students and others by consent of the instructor. 3 s.h. (W) HENDRIX

*163. MUSIC IN THE EIGHTEENTH CENTURY.—The development of important instrumental and vocal media and formal concepts through study of the music, the musicians and their environment. 3 s.h. (E) BRYAN

*164. MUSIC IN THE NINETEENTH CENTURY.—A study of the music of the nineteenth century, from Beethoven to Debussy, with attention to artistic and

literary influences, and the relations among the creative minds of the time. Individual projects. 3 s.h. (E) MRS. MUELLER

*165. OPERA LITERATURE.—A study of opera from the Florentine Camerata to the present. The development of the operatic idea, with attention to changing relationships of music and text, to opera as social commentary, as well as to formal and stylistic means. Intensive study of complete scores of composers selected from Monteverde to Bartok; individual projects. 3 s.h. (E) SAVILLE

## INDEPENDENT STUDY AND SENIOR SEMINAR

Admission to these courses will be subject to approval of the Director of Undergraduate Studies of the Department of Music and the individual instructor. The instructor as well as the course content will be established in accordance with the individual student's interests and capacities.

The Department offers work leading to graduation with distinction. See the section on Academic Honors on page 36.

191, 192. INDEPENDENT STUDY.—Designed to permit superior students to pursue independent reading and musical analysis within a prescribed area of musical literature. Open to juniors. See page 36. 6 s.h. (E) STAFF

193, 194. INDEPENDENT STUDY.—Same as 191, 192 but for seniors. See page 36. 6 s.h. (E) STAFF

195. CORRELATING INDEPENDENT STUDY.—Correlated study in the humanities, cultural epochs in European civilization or church history and liturgy is suggested. An extended paper is required. Intended primarily for senior music majors, but other qualified students may be admitted. 3 s.h. (E) KLENZ

197, 198. SENIOR SEMINAR IN MUSIC.—Offers guidance in the sources and materials of musical literature, and in the methods of stylistic analysis and criticism. A background of historical, stylistic, and theoretical knowledge is essential. Formal papers will be required. Open only to seniors, but not restricted to candidates for degree with distinction. 6 s.h. (E) STAFF

## MUSIC EDUCATION

57-58. VOCAL DICTION.—Problems of diction as specifically applied to the art of singing. Required of all Applied Voice Majors. 2 s.h. (E) HANKS

106. PIANO METHODS AND MATERIALS.—A study of the materials and methods of piano pedagogy. The appropriate choice of essential and supplementary literature. Development of technique, style, and musicianship. Supervised practice teaching. Prerequisite: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) WITHERS

151. PUBLIC SCHOOL MUSIC EDUCATION.—Development of the child through music. Child voice and song literature; rhythmic activities; learning to listen; use of elementary instruments such as the autoharp, psaltery, bells, rhythm band instruments. Both group and individual help in elementary music theory; music reading exercises; chording and improvising piano accompaniments; conducting; construction of rhythm band scores. Integration of music with other activities, such as planning music for social studies units. 3 s.h. (E) MCCALL

152. PUBLIC SCHOOL MUSIC LITERATURE.—A study and analysis of key works in the symphonic, pianistic, and vocal repertoire which are particularly applicable to the teaching of music appreciation as a cultural aspect of social studies in the public school. 3 s.h. (E) MCCALL

153. VOCAL MUSIC IN THE PUBLIC SCHOOL.—Aims, repertoire, and techniques for teaching vocal music in the junior and senior high schools. Emphasis on organizations, administration, training, and performance of school choirs and ensembles; care of the changing voice. Planning a good music curriculum. 3 s.h. (E) SAVILLE

154. INSTRUMENTAL MUSIC IN THE PUBLIC SCHOOL.—Materials and methods of teaching instrumental music in the junior and senior high schools; emphasis on teaching technics, repertoire, organization, and administration of the instrumental curriculum. 3 s.h. (E) BONE

## APPLIED MUSIC

The study of Applied Music concerns the understanding of music literature through performance. Instruction is offered in the following media: A. Piano; B. Strings; C. Woodwinds; D. Brass; E. Voice; F. Ensemble—Instrumental, Piano, Vocal coaching and performance; participation through one of the Departmental Ensembles listed at close of the Music section; G. Organ. Instruction in media A through E may be private or in classes limited to a minimum of 4 and a maximum of 7 students. Class instruction is restricted to the first 4 grades of proficiency. Class instruction shall be designated by adding the letter X to the appropriate medium and year-in-school classification. (Example: junior year, Woodwinds, class instruction is recorded 147CX.)

Students must contact the Music Department office so as to arrange an audition with the appropriate instructor *prior to registration in Applied Music courses.* The course numbers listed below refer to the student's class standing and not his musical proficiency.

47A, 48A; 97A, 98A; 147A, 148A; 197A, 198A. PIANO.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) WITHERS; FISHBAUGH

47B, 48B; 97B, 98B; 147B, 148B; 197B, 198B. VIOLIN, VIOLA, 'CELLO.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) J. PEPPER; LESHIN; B. PEPPER

47C, 48C; 97C, 98C; 147C, 148C; 197C, 198C. WOODWINDS.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HENRY

47D, 48D; 97D, 98D; 147D, 148D; 197D, 198D. BRASS.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) BRYAN

47E, 48E; 97E, 98E; 147E, 148E; 197E, 198E. VOICE.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HANKS; MRS. CUSHMAN

47F, 48F; 97F, 98F; 147F, 148F; 197F, 198F. ENSEMBLE.—For freshmen, sophomores, juniors, seniors. 1 s.h. (E) STAFF

47G, 48G; 97G, 98G; 147G, 148G; 197G, 198G. ORGAN.—For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) HENDRIX

*Credits:* Credit for instruction in media A, B, C, D, E, and G is granted on the basis of 2 s.h. per semester for *one hour* of private instruction per week and a minimum of six hours practice weekly; or 1 s.h. per semester for *one-half hour* of private instruction, or one period of class study, and a minimum of six hours practice per week. An additional weekly class meeting for performance and criticism may be required by the instructor without additional credit.

Credit for instruction in medium F is granted on the basis of 1 s.h. per semester for one rehearsal period of instruction and a minimum of three hours practice per week

*Music majors* shall plan their Applied Music study so as to meet the following requirements of their chosen areas of concentration:

Majors in Music Theory or Music History and Literature must earn a minimum of 6 s.h. credit in Applied Music.

Majors in Applied Music must register for one hour of private instruction *per semester* and may earn a maximum of 18 s.h. credit in Applied Music.

Majors in Music Education who expect to teach music in the public schools should plan their Applied Music programs in consultation with the Director of Undergraduate Studies in Music. The credit hours in Applied Music required for certification in North Carolina may be earned through a program which includes the study of a major medium, a minor medium and participation in departmental organizations. (See p. 43 of this *Bulletin*).

*Students other than music majors may receive not more than 8 s.h. credit for work in Applied Music.* They may elect, after consultation with the Department either 1 hour (2 s.h. credit) or ½ hour (1 s.h. credit) of private instruction per semester. *No credit in Applied Music* will be allowed unless the student satis-

factorily completes at some time before graduation six semester hours in Music Theory, or Music History and Literature.

FEES: Upper class students who have been accepted as music majors at the time of registration for applied music courses are exempt from paying the applied music fees. Other students are charged for all applied music media except "F" (Ensemble).

Fees are payable to the Treasurer's office of Duke University upon notification from that office at the beginning of each semester as follows:

| | |
|---|---|
| One ½ hour private lesson per week for one semester | $45.00 |
| Two ½ hour private lessons per week or one 1-hour private lesson per week for one semester | 80.00 |
| One 1-hour class lesson per week for one semester | 20.00 |

All students registered for applied music instruction are charged for practice room facilities as follows:

| | |
|---|---|
| Medium A. Piano<br>Medium E. Voice<br>Medium G. Organ | $15.00 per semester (room with piano or organ) |
| Medium B. Strings<br>Medium C. Woodwinds<br>Medium D. Brass | $10.00 per semester (room without piano) |
| Medium F. Ensemble | No practice room fee is charged |

## DEPARTMENTAL MAJOR

*Prerequisites:* Music 51-52 and 65-66.

*Major Requirements:* A minimum of 24 s.h. beyond the prerequisite courses. Initial work in the Department includes the following required courses:

| | |
|---|---|
| Freshman Year: | Music 65-66 |
| Sophomore Year: | Music 51-52, Music 115-116 |
| Junior Year: | Music 147-148 |

During Orientation Week all prospective entering Freshman Music Majors are required to take: A. Piano proficiency exam., B. Theory proficiency exam., C. Audition in their major performance medium.

### Areas of Upperclass Specialization

Concentration in one of four major areas in Music is possible in the Junior and Senior years. While the following outlines include more than the number of hours *required* for a major in music, they are strongly recommended by the Department as a basis for effective study.

*Theory and Composition*

Required:
Music 117-118, 195 or 196; Applied Music: 6 s.h.

Additional Departmental Recommendations:
Music 122; plus Music Electives: 6 s.h.

*History and Literature*

Required:
2 Elective Courses in Music Literature; plus Music 195, 196; Applied Music: 2 s.h.

Additional Departmental Recommendations:
Music Electives: 10 s.h., including a minimum of 4 s.h. in Applied Music.

*Applied Music*—A program of study designed for those students who intend to become performers and teachers of applied music.

Required:
Applied Music: 12 s.h.

Additional Departmental Recommendations:
Applied Music: 6 s.h.
Piano or Organ:
Music 135 or 149; 106 (Piano Majors only)
Voice:
Music 136; 57-58.
Other Media:
Study sequence to be worked out in consultation with the Director of Undergraduate Studies.

*Music Education*—A program of study designed for prospective teachers of High School Instrumental or Vocal Music. Details of this program are shown on page 43 of this *Bulletin*.

The music major must participate in one of the Departmental Ensembles or Organizations during *each* semester of undergraduate study.

DEPARTMENTAL ENSEMBLES

Brass Ensemble
Chamber Orchestra
Madrigal Singers
Piano Ensemble (may be in combination with Instruments or Voice)
String Ensemble (Sonata, Trio or Quartet)
Vocal Ensemble (Opera Workshop)
Woodwind Quintet

DEPARTMENTAL ORGANIZATION

Duke University Concert Band
Duke University Symphony Orchestra

## NAVAL SCIENCE

PROFESSOR DURANT, COLONEL, U.S. MARINE CORPS, CHAIRMAN; ASSOCIATE PROFESSOR LE TOURNEAU, COMMANDER, U. S. NAVY, DIRECTOR UNDERGRADUATE STUDIES; ASSISTANT PROFESSORS: TWOMEY, MAJOR, U. S. MARINE CORPS; GOBEN, LIEUTENANT COMMANDER, U. S. NAVY; STUTZ, LIEUTENANT, U. S. NAVY; CRACKNELL, LIEUTENANT, U. S. NAVY; AND INSTRUCTOR JONES, LIEUTENANT (JG), U. S. NAVY

Standardized titles and numbers for courses are established by the Bureau of Naval Personnel for use at the 52 NROTC institutions. The first digit indicates the year of the course; the second digit (0) indicates that it is given on a semester basis; the third digit indicates the semester of the school year in which offered. Specialized courses for Marine Corps Officer candidates are indicated by the letter "M" after the number, and substitute for the basic course of the same number.

NS 101. NAVAL ORIENTATION.—History of navy regulations, naval customs and courtesies which are basic to further study of Naval Science. Introduction to carrier, air, surface, undersea, and amphibious warfare; basic types, characteristics, capabilities, and limitations of naval vessels; deck seamanship; naval formations and maneuvers. 3 s.h. (w) LE TOURNEAU, CRACKNELL, AND JONES

NS 102. NAVAL HISTORY.—Naval history relating the rise and fall of sea power to other aspects of world history as a basis for understanding the role of navies in the world today. 3 s.h. (w) LE TOURNEAU AND CRACKNELL

91. INTRODUCTORY PSYCHOLOGY.—See page 115 of this *Bulletin* for course description. This is a University course required for all NROTC midshipmen.

NS 202. NAVAL WEAPONS.—A survey of the fundamentals of naval weapons and systems including the gun-weapon delivery problem, anti-submarine warfare, missiles, nuclear weapons, and space technology and their application to the control of the seas. 3 s.h. (w) JONES

NS 301. NAVIGATION.—Magnetic and gyro compasses; principles of chart construction; dead reckoning; piloting, nautical astronomy including a study of the actual and apparent motion of the earth, celestial coordinates, times systems, the astronomical triangle, identification of stars and planets; solutions of observations for lines of position; and work in practical navigation. 3 s.h. (w) STUTZ

NS 302. NAVAL OPERATIONS.—A survey of the components of general naval operations including concepts and application of relative motion, collision prevention, communications, weather, and the command and delegated functions involved in maneuvering single ships and multiship formations. 3 s.h. (w) STUTZ

NS 401. NAVAL ENGINEERING.—Principles of steam engineering as related to naval power plants for main propulsion and auxiliary machinery; principles of the marine nuclear engineering propulsion system; principles of ship stability and damage control; a general understanding of internal combustion engines. 3 s.h. (w) GOBEN

NS 402. PRINCIPLES AND PROBLEMS OF LEADERSHIP.—A study of the principles and problems of effective leadership with emphasis on the role of the military leader. Leadership precepts of personal example, sound management practice, and moral responsibility; human relations; discipline and administration of military justice are included. 3 s.h. (w) GOBEN

NS 401M. AMPHIBIOUS WARFARE.—History and development of amphibious operations and organization; analyses of amphibious operations of World War II and of the Korean action. 3 s.h. (w) TWOMEY

For Marine Corps Candidates.

NS 402M. AMPHIBIOUS WARFARE, PART II.—Further study of selected amphibious operations; Uniform Code of Military Justice; leadership. 3 s.h. (w)

For Marine Corps Candidates.

TWOMEY

## PHILOSOPHY

PROFESSOR BAYLIS, CHAIRMAN; ASSOCIATE PROFESSOR WILSON, DIRECTOR OF UNDERGRADUATE STUDIES; ASSISTANT PROFESSOR BINKLEY, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS NEGLEY, PEACH, AND WELSH; ASSOCIATE PROFESSOR CLARK; ASSISTANT PROFESSOR SPECTOR

The undergraduate program in the Department of philosophy is designed to acquaint students with the content and the structure of philosophical theory in various areas. Discussion is encouraged so that the student can engage actively in the philosophical examination of problems.

Course offerings fall into two general categories: the systematic and the historical. In a systematic treatment, the organization of a course is primarily in terms of the problems presented by the subject-matter of that course, as in logic, ethics, metaphysics, etc. In historical courses, attention is directed more to the order of development in the thought of a particular philosopher (Plato, Aristotle, Kant, etc.), or in a historical period. In all courses, reading of the works of philosophers will acquaint the students with the important and influential contributions to the definition and solution of philosophical issues.

The problems raised in philosophy in respect to the various field of the arts and sciences involve questions which are not normally given attention in those particular disciplines. In the consideration of such problems, therefore, it is expected that the student will acquire some understanding and perspective of the major areas of man's intellectual endeavor. In this sense, philosophical comprehension is an essential part of a student's learning and education.

41, 42. KNOWLEDGE, FACT, AND VALUE.—An introduction to philosophy through the study of some of its main problems. These include, in Philosophy 41, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. In Philosophy 42 these include the nature and ground of values, ultimate goals, and moral obligation. (Philosophy 42 may be taken before, or with, Philosophy 41.) 6 s.h. STAFF

48. LOGIC.—A study of the conditions of effective thinking and clear communication. Examination of the basic principles of *deductive* reasoning. Open to freshmen and sophomores only. 3 s.h. BINKLEY, CLARK, AND WELSH

93, 94. HISTORY OF PHILOSOPHY: ANCIENT AND MODERN.—An introduction to philosophy through the study of some of the major writings of the ancient Greek philosophers (93) and modern philosophers through Kant (94). 6 s.h. (E) (Open to freshmen with a *B* average.) PEACH AND WILSON

101. PHILOSOPHY OF RELIGION.—A philosophical examination of selected concepts and doctrines of religion. 3 s.h. (E) BINKLEY

103. SYMBOLIC LOGIC.—Detailed analysis of deduction and of deductive systems. Open to sophomores only by permission of instructor. 3 s.h. (E) CLARK AND WILSON

104. PHILOSOPHY OF SCIENCE.—The principal philosophical and methodological problems in contemporary science. 3 s.h. (E) SPECTOR

107. POLITICAL AND SOCIAL PHILOSOPHY.—Discussion of the fundamental principles of political and social organizations, with particular attention to democratic philosophy, corporate theory, and Marxist-Soviet philosophy. 3 s.h. (W) NEGLEY

108. SOCIAL IDEALS AND UTOPIAS.—Reading of selected Utopias; analysis of the value-structures and political principles of these ideal societies. 3 s.h. (W) NEGLEY

109. PHILOSOPHY OF LANGUAGE.—A philosophical analysis of problems arising in the study of language and symbolism. Topics include: the nature of language, sign-using behavior, theories of meaning, types of discourse (scientific, mathematical, poetic), definition, ambiguity, metaphor. 3 s.h. (E) WELSH

110. EPISTEMOLOGY.—A treatment of the problems of truth and knowledge; of *a priori* and empirical statements; and of theories of perception and probability. 3 s.h. (E) BAYLIS, BINKLEY

111. METAPHYSICS.—A consideration of a selection from the following: Hegelian essentialism and existentialist reaction; traditional treatments of the mind-body problem: dualism, phenomenalism and materialism; rival theories of causation, space and time. 3 s.h. (E) BAYLIS, BINKLEY, AND WILSON

117. HISTORY OF ETHICS.—The development of ethical thought in the West; the interaction between culture and ethical theory, with special reference to the Greek city-state, Roman law, the Renaissance, the Reformation, and the rise of modern science. Readings in the great ethical philosophers. 3 s.h. (E) WELSH

FOR SENIORS AND GRADUATES

202. PHILOSOPHY OF ART.—A study of some fundamental issues in aesthetics, with particular reference to the fields of literature, music, and painting. Problems discussed include: the nature and purposes of the arts; meaning in the arts; art and morality; the role of standards in art criticism; aesthetic judgment; interpretation and evaluation. 3 s.h. (E) WELSH

203. CONTEMPORARY ETHICAL THEORIES.—Study of the nature and justification of basic ethical concepts in the light of the chief ethical theories of twentieth century British and American philosophers. 3 s.h. BAYLIS AND BINKLEY

205. THE PHILOSOPHY OF HISTORY.—Discussion of the method, metaphysical implications, and influence of interpretations of history; Hegel, Marx, Spengler, Toynbee. 3 s.h. (W) NEGLEY

208. POLITICAL VALUES.—Analysis of the systematic justification of political principles and the political values in the administration of law. 3 s.h. (W) NEGLEY

211. PLATO.—A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 s.h. (E) BINKLEY

217. ARISTOTLE.—A study of parts of the *Organon, Physics, De Anima,* and *Metaphysics.* 3 s.h. (E) WILSON

219. KANT.—Reading and discussion of his philosophy, with some attention to historical continuity. 3 s.h. (W) NEGLEY

225. BRITISH EMPIRICISM.—A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 s.h. (E) PEACH

227. CONTINENTAL RATIONALISM.—A critical study of the writings of Descartes, Spinoza, or Leibniz, with special emphasis on problems in the theory of knowledge and metaphysics. 3 s.h. (E) PEACH

228. RECENT AND CONTEMPORARY PHILOSOPHY.—A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 s.h. (E) WELSH

229. AMERICAN PRAGMATISM.—Studies in the philosophy of Pierce, James, Dewey, and Mead. 3 s.h. (E) WELSH

233. INTRODUCTION TO THE PHILOSOPHY OF SCIENCE.—A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. SPECTOR

234. PHILOSOPHY OF SCIENCE.—Selected problems in the physical and nonphysical sciences. Topics such as space, time, measurement, probability and induction, and problems in the philosophy of the behavioral and social sciences. Prerequisite: Philosophy 233. SPECTOR

235. PHILOSOPHY AND THE SCIENCES.—An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincare, and Einstein. (1964-65) SPECTOR

236. SPECIAL PROBLEMS IN THE PHILOSOPHY OF SCIENCE.—Selected topics concerning the methods of the sciences and the philosophy of science. (1964-65) Prerequisite: Previous work in the philosophy of science, or consent of the instructor. SPECTOR

The four courses above are given normally in a two year cycle.

241. LOGIC.—Fundamental problems of logic. 3 s.h. (E) CLARK AND WILSON

246. GENERAL SEMANTICS AND THEORY OF LANGUAGE.—An examination of semantical theory through Frege, Russell, Church, Tarski, Carnap, and Quine, together with a consideration of the implications of meaning theory for general philosophy. 3 s.h. (E) WILSON

250. PHILOSOPHICAL ANALYSIS.—A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and results on this movement. 3 s.h. (E) BAYLIS, CLARK, AND WILSON

252. METAPHYSICS.—A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 s.h. (E) BAYLIS, CLARK, AND WILSON

291, 292. CRITICAL PHILOSOPHY.—The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem solving. 3 s.h. each. Enrollment only by permission of the department. 291 is ordinarily prerequisite for 292. (E) THE GRADUATE STAFF

## DEPARTMENTAL MAJOR

Philosophy 48 (Logic) is recommended for all those intending to major in philosophy. Philosophy 41, 42 is ordinarly a prerequisite to major work.

*Major requirements:* 24 semester hours in philosophy of which at least eighteen must be in courses numbered above 48. The following must be included:

Philosophy 93 and 94.
Philosophy 117, or 203, or 208.
6 semester hours in Philosophy senior-graduate courses.

*Related Work:* Six hours minimum in each of two departments approved by the Philosophy adviser. Courses may not be those primarily open to freshmen.

There is no restriction in principle as to departments in which related work may be taken, and the approval of the Philosophy adviser is required only to insure some coherence in the program of major and related work as a whole.

The Department offers work leading to graduation with distinction. See the section on Honors.

## PHYSICS

PROFESSOR FAIRBANK, CHAIRMAN; ASSOCIATE PROFESSOR MEYER, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR CARPENTER, SUPERVISOR OF FRESHMAN INSTRUCTION; PROFESSORS BIEDENHARN, FOWLER, GORDY, GREULING, LEWIS, NEWSON, NIELSEN, AND SPONER; ASSOCIATE PROFESSOR ROBINSON; VISITING ASSOCIATE PROFESSOR ROBL; ASSISTANT PROFESSORS BILPUCH, EVANS, ONLEY, ROBERSON, TANGHERLINI, TILLEY, AND WALTER; VISITING ASSISTANT PROFESSOR MIYAGAWA; LECTURER BARTON; INSTRUCTOR HUNT

1-2. INTRODUCTORY PHYSICS.—This course traces historically and experimentally the development of the important principles of physics. This course is open to freshmen, sophomores and juniors and meets the general science requirement. Three lectures and one two-hour laboratory each week. 8 s.h. (w)
CARPENTER, NIELSEN, BARTON, AND ASSISTANTS

41-42. GENERAL PHYSICS.—This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Prerequisites: Mathematics 21, 22 or equivalent (Mathematics 21, 22 may be taken concurrently). 8 s.h. (w)
CARPENTER, LEWIS, FAIRBANK, GREULING, ONLEY, TANGHERLINI, EVANS, WALTER, AND ASSISTANTS

125. INTERMEDIATE PHYSICS—MECHANICS.—The course covers in a thorough manner the elements of mechanics. Three recitations per week. Prerequisites: Physics 1-2 or 41-42 or equivalent, and a course in differential and integral calculus. Mathematics 22 may be taken concurrently. 3 s.h. (w) TILLEY

126. INTERMEDIATE PHYSICS—ELECTRICITY.—The elements of electricity and magnetism. Three lectures and one three-hour laboratory per week. Prerequisites: Physics 125 or equivalent work approved by the instructor and differential and integral calculus. 4 s.h. (w) TILLEY

161, 162. MODERN PHYSICS.—Review of electromagnetic fields, relativity, quantum phenomena, atomic and molecular spectra, solids, and nuclear physics. Three lectures each week. Prerequisites: Physics 41-42, Mathematics 22. 161 is prerequisite for 162. 6 s.h. (w) ROBERSON

171. ELECTRONICS.—A.C. circuits, transients, fundamentals of vacuum tubes and electron physics, basic electronic circuits. Three lectures and one three-hour laboratory each week. Prerequisite: Physics 126 or equivalent work approved by the instructor. 4 s.h. (w) HUNT

176. INTERMEDIATE PHYSICS—THERMODYNAMICS AND KINETIC THEORY.—The elements of thermodynamics, kinetic theory and elementary statistical mechanics. Three lectures per week. Prerequisites: Physics 125 or equivalent work approved by the instructor, and differential and integral calculus. 3 s.h. (w)
MEYER

A course in general college physics, Physics 125 and 126 or equivalent validated by examination, and a course in differential and integral calculus are prerequisites to all courses numbered 200 and above.

201, 202. MECHANICS.—The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and rigid bodies; the methods of LaGrange and Hamilton; generalized mechanics. 6 s.h. TANGHERLINI

213, 214. CONTEMPORARY PHYSICS.—A course which covers the fundamental

concepts and the experimental basis of modern physics. Three lectures each week. 6 s.h. (w) WALTER

217, 218. ADVANCED PHYSICS LABORATORY.—Measurements involving the fields of mechanics, electricity, magnetism, heat, optics and modern physics. 6 s.h. (w) MEYER

219. ELECTRICITY AND MAGNETISM.—Fundamentals of electricity and magnetism. Physical optics. Electromagnetic waves. 3 s.h. (w) GREULING

220. ADVANCED ELECTRONICS.—Vacuum tubes and solid state devices, advanced circuit analysis. Three lectures and one three-hour laboratory each week. 4 s.h. (w) HUNT

221, 222. THEORETICAL PHYSICS.—Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optic, relativity thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 s.h. (w) ROBL

225, 226. ELEMENTARY INVESTIGATIONS.—The aim of this course is to provide training in the laboratory and library methods of physical research. Properly qualified students may conduct elementary investigations under the supervision of a member of the staff. 3-6 s.h. (w) THE STAFF

### DEPARTMENTAL MAJOR

A student wishing to major in physics should arrange to complete the necessary mathematics as soon as possible.

A. for the A.B. degree:

*Prerequisites:* Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22.

*Major Requirements:* At least 18 semester hours in physics including Physics 125, 126, 171 and 176 or equivalent 217 or 218.

*Related Work:* Eighteen to 24 semester hours from the following courses: Mathematics 21, 22, 63, 64 and 131, and Chemistry 1-2.

B. for the B.S. degree:

*Prerequisites:* Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22 or equivalent.

*Major Requirements:* Physics 125, 126, 171, and 176 or equivalent, 213, 214, 217, 218 and either 201 or 219.

*Related Work:* Fourteen to 24 semester hours from the following courses: Mathematics 21, 22, 63, 64 and 131, and Chemistry 1, 2 or 1 and 42.

The Department offers work leading to graduation with distinction. See the section on Honors.

## POLITICAL SCIENCE

PROFESSOR RANKIN, CHAIRMAN; ASSISTANT PROFESSOR HOWARD, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BALL, BRAIBANTI, COLE, CONNERY, HALLOWELL, AND WILSON; VISITING PROFESSOR KULSKI; ASSOCIATE PROFESSORS HALL, LEACH, PROCTOR, SIMPSON, AND SINDLER; VISITING ASSOCIATE PROFESSOR JEWELL; ASSISTANT PROFESSORS CHEEK AND KEARNEY; DRS. MORGAN AND PIPER; MESSRS. LOVINK AND PILANT

The general objective of the Department of Political Science is to acquaint students with the theory and practice of government and politics at the local, state, national and international levels. While primary attention is focused upon the American political and administrative system, emphasis is also placed upon a comparative study of the political institutions and movements of thought peculiar to the nations of Europe, Latin America and the Far and Middle East. The student's attention is also directed to the problems encountered in international organization, politics and law. The development of political theories from Plato to the present day is an essential part of the department's course offerings. Methods of study include the descriptive, the historical, the legal, the comparative and the philosophical.

Directing its effort to an intelligent understanding of the contemporary world and of the responsibilities which are laid upon citizens of a democracy, the Department of Political Science shares the general objectives of a liberal arts education. While the department does not aim at vocational education, the knowledge it seeks to impart should be useful to anyone contemplating a career in the government service or politics.

Students intending to major in the department should take Political Science 11-12 or 61-62. Ordinarily one of them must be taken before proceeding to more advanced work in the department. This rule may be waived with the consent of the Director of Undergraduate Studies.

The advanced courses are divided into three major groups but no sequence of courses beyond the introductory course is prescribed. The student would be well advised, however, to select some courses from each group.

The Senior Seminar is designed to provide an opportunity for majors in the department to pursue independent study and research, and to qualify for graduation with distinction.

## INTRODUCTORY COURSES

11-12. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. An introductory course for freshmen dealing with the topics indicated in the description of Political Science 61-62. (Open only to Freshmen) 6 s.h. (E & W)

HALL AND SINDLER; CHEEK AND KEARNEY; MORGAN

61-62. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. The first semester is devoted to the study of American constitutional democracy. Topics examined include federal-state relations, the separation and interrelationships of the executive, legislative and judicial branches of government, judicial review, the role of political parties and public opinion, the formulation and execution of domestic and foreign policy, civil liberties. The second semester is devoted to a study of constitutional democracy in Great Britain and France with emphasis upon the similarities and differences between those systems and our own. Detailed attention is also given to an examination of the theory and practice of totalitarian dictatorship as exemplified in the U.S.S.R. 6 s.h. (E & W) (Not open to Freshmen)

CONNERY, LEACH, SIMPSON, AND JEWELL; CHEEK, HOWARD, AND KEARNEY; LOVINK, MORGAN, AND PILANT

## POLITICAL THEORY AND COMPARATIVE GOVERNMENT

123. INTRODUCTION TO POLITICAL PHILOSOPHY.—A course devoted to the reading and discussion of selected political classics including Plato's *Republic,* Aristotle's *Ethics* and *Politics* and other works as time permits. 3 s.h. (W)

HALLOWELL AND LEACH

127. INTRODUCTION TO LAW.—An introduction to the nature and functions of law, with emphasis on the varied uses of law in ordering society, the process of legal growth and the nature of legal reasoning. Some attention will be given to basic issues of jurisprudence. 3 s.h. (W) Open only to Juniors and Seniors.

HOWARD

136. MAJOR EUROPEAN GOVERNMENTS.—A general introductory survey of the governments of Great Britain, France, Germany, Italy, and the Soviet Union. Special attention is given to constitutional developments, the organization and ideologies of political parties, and current political problems. 3 s.h. (W) [Not open to students who have taken Political Science 12 or 62 but open to all others without prerequisite.]

COLE

143. COMPARATIVE GOVERNMENT AND POLITICS: THE MIDDLE EAST.—Political institutions and behavior in the Arab states, Israel, Turkey and Iran. 3 s.h. (W)

PROCTOR

151. COMPARATIVE GOVERNMENT AND POLITICS: LATIN AMERICA.—A study of politics and government in selected Latin American states, including

Argentina, Brazil, Chile and Mexico. Political forces and their impact upon governmental institutions. 3 s.h. BALL

160. THE GOVERNMENT AND POLITICS OF THE USSR.—An analysis of the governmental institutions, party structure, and policies of the Soviet Union. Attention will be given to policies affecting the intelligentsia, the workers, and the peasants. 3 s.h. KULSKI

180. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA I.—An introduction to the civilization of the Indian subcontinent—the rise and decline of Mughal rule, British rule, the partition of 1947, and the rise of independent India. 3 s.h. (w) BRAIBANTI

181. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA II.—An introduction to the Muslim component of Indian civilization. Particular attention will be given to the development of a political system in Pakistan. Some attention will also be given to Ceylon and Malaya. 3 s.h. (w) BRAIBANTI

182. COMPARATIVE GOVERNMENT AND POLITICS: JAPAN.—Although Chinese civilization will be studied as it relates to Japan, primary emphasis will be on the development of Japan's political system, starting with the Taikwa Reform and continuing to the present day. 3 s.h. (w) BRAIBANTI

183. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHEAST ASIA.—An analysis of the development of government in Thailand, Vietnam, Burma, Malaya, Indonesia and the Philippines. Attention will be given to the Islamic, Buddhist and other indigenous cultures of these nations. 3 s.h. (w) KEARNEY

223. POLITICAL THOUGHT TO THE SEVENTEENTH CENTURY.—A survey from the time of Plato to the close of the sixteenth century; Graeco-Roman. Patristic and Germanic thought; individualism and cosmopolitanism; effect of the Church-State controversy and the conciliar movement; medieval constitutionalism; legislative sovereignty. 3 s.h. (w) WILSON AND HALLOWELL

224. MODERN POLITICAL THEORY.—An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 s.h. (w) HALLOWELL

225. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 s.h. (w) COLE

226. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 s.h. (w) COLE

229. RECENT AND CONTEMPORARY POLITICAL THEORY.—The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 s.h. (w) HALLOWELL

231. AMERICAN POLITICAL THEORY.—An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 s.h. (w) HALLOWELL

235. THE BRITISH COMMONWEALTH.—An analysis of the political relationships between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. 3 s.h. (w) COLE

250. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA I.—Political development of the Indo-Pakistan subcontinent until the partition of 1947 and the development of India after that date. Attention will be given to the structure of Indian society and to political problems under British rule. Principal emphasis will be on the development of India as an independent state and on the relationship of politics to economic development. 3 s.h. (w) BRAIBANTI

251. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHERN ASIA

II.—A continuation of Political Science 250 with chief emphasis on the political development of Pakistan since 1947. Comparative analysis of India and Pakistan. Some attention will also be given to Ceylon and Malaya, as members of the Commonwealth. 3 s.h. (w) BRAIBANTI

252. COMPARATIVE GOVERNMENT AND POLITICS: JAPAN.—A survey of the civilization of Japan, and an analysis of political development from the Taikwa Reforms to the modern period. 3 s.h. (w) BRAIBANTI

260. THE GOVERNMENT AND POLITICS OF THE U.S.S.R.—An analysis of the governmental institutions, party structure and policies of the Soviet Union. Attention will be given to policies affecting the intelligentsia, the workers and the peasants. 3 s.h. KULSKI

AMERICAN GOVERNMENT AND PUBLIC ADMINISTRATION

109. STATE AND LOCAL GOVERNMENT TODAY.—Problems in state, county and city government including the administration of government services such as education, public welfare, law enforcement; inter-governmental relationships; administrative reorganization; methods of popular control; and the reconstruction of state and local government so as to meet present-day needs. 3 s.h. (E) LEACH AND CHEEK

125. AMERICAN POLITICAL PARTIES AND PRACTICAL POLITICS.—A study of the historical development, organization, and methods of political parties in the United States. 3 s.h. (w) SIMPSON

129. GROUPS IN AMERICAN POLITICS.—A study of the composition, methods, and policies of organized groups as they participate in the creation of public opinion and in the formulation of public policy. Attention will be focused on recent national policy in the areas of agriculture, business, labor, education, welfare, foreign affairs, and on the roles that groups play in the formulation of these policies. 3 s.h. (w) SINDLER AND JEWELL

137. POLITICAL BEHAVIOR IN ELECTIONS.—The behavioral approach will be used to examine decision-making in the political process. Attention will be focused on the major factors that affect the outcome of elections, such as the characteristics of the American voter, the conduct of campaigns, the influence of propaganda and public relations techniques, and the influence of campaign finance. 3 s.h. (w) SINDLER AND JEWELL

138. POLITICAL BEHAVIOR IN POLICY MAKING.—A study of the major factors that come into play in the making of governmental policy decisions. Special attention will be paid to the role of pressure groups and the methods of their lobbyist representatives, to the effects of pressures from constituents, and to the pressures of the executive and legislative branches upon each other. 3 s.h. (w)

141. PUBLIC ADMINISTRATION.—An introduction to the role of administration in the governmental process considering principles of administrative organization, methods of administrative control, personnel and fiscal management. In general the study of the organizational and administrative problems encountered by any government agency charged with carrying out a public policy. 3 s.h. (w) HALL

142. ADMINISTRATIVE RESPONSIBILITY.—An evaluation of political, legal and administrative methods of achieving a responsible bureaucracy in American national government. Comparisons will be made with relevant experience and techniques in other countries such as Great Britain and France. 3 s.h. (w) HALL

146. LEGISLATION.—A study of the composition and structures of legislative bodies and of the legislative process with attention to procedure, methods, techniques, delegation of discretion, and the use of controls. 3 s.h. (w) SIMPSON

161. GOVERNMENT AND PLANNING.—A study of the planning functions at all levels of government in the United States. Particular attention will be devoted to the problems posed for planning by metropolitan growth. 3 s.h. (w) LEACH

164. GOVERNMENT REGULATORY POLICY AND ADMINISTRATION.—A

consideration of selected regulatory policies of the American national government, such as anti-trust, transportation and communications, and of the administrative procedures and organizations designed to effect those policies. 3 s.h. (w) HALL

174. POLITICAL IMPLICATIONS OF ECONOMIC LEGISLATION.—A study of political and sectional alignments in the passage of tariff, farm, railway, New Deal and other economic legislation. 3 s.h. (w) SIMPSON

190. CAREER PROBLEMS IN GOVERNMENT.—Principles, techniques, and problems of public service; recent approaches to the teaching of American government and to public personnel practices. 3 s.h. (w) CHEEK

*The course is designed especially for students planning to teach or to enter the government career service.*

207. AMERICAN CONSTITUTIONAL LAW AND THEORY.—A study of the leading principles of American government, as developed through judicial interpretation of the Constitution. 3 s.h. (w) RANKIN

208. AMERICAN CONSTITUTIONAL LAW AND CURRENT NATIONAL PROBLEMS.—A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 s.h. (w) RANKIN

209. PROBLEMS IN STATE AND LOCAL GOVERNMENT IN THE UNITED STATES.—A study of the historical development of state and local governments, their present organization and subdivisions, and their relation to each other. Special attention is given to the position of the states in the federal union through the study of federal-state, inter-state, and state-local relations. 3 s.h. (w) RANKIN

230. AMERICAN POLITICAL INSTITUTIONS.—A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics this course in concerned with the Constitutional Convention of 1787, and the development of Congress, the Presidency, and the Supreme Court. 3 s.h. (w) RANKIN

234. CIVIL-MILITARY RELATIONSHIPS IN AMERICAN GOVERNMENT.—A consideration of the role of the military in American government both in theory and in practice. Special emphasis will be given to formal civil-military structural arrangements for determining policies, such as the National Security Council, and to the degree of civilian control within the military establishment. 3 s.h. (w) CONNERY

241. ADMINISTRATIVE MANAGEMENT.—An advanced course in public administration with special attention being given to the development of scientific management, its application to government in the United States and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 s.h. (w) CONNERY

242. NATIONAL ADMINISTRATION.—A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 s.h. (w) CONNERY

244. ADMINISTRATIVE LAW AND PROCESS.—The nature and law of the administrative process in the context of American government and politics, with special attention to the powers, procedures, and judicial control of administrative agencies. 3 s.h. HALL

246. GOVERNMENT ADMINISTRATION AND PUBLIC POLICY.—Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in the field of public policy, and their possible solution. 3 s.h. (w) CONNERY

275. THE NATIONAL PARTY SYSTEM.—An intensive examination of selected facets of American national political parties, such as: relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 s.h. (w) SINDLER AND JEWELL

276. COMPARATIVE STATE PARTIES AND POLITICS.—A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organi-

zation, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 s.h. (w) SINDLER AND JEWELL

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 3 s.h. (w) RANKIN AND LEACH

292. MUNICIPAL ADMINISTRATION.—A study of principles and methods relating to municipal administration in the United States. 3 s.h. (w) RANKIN AND LEACH

## INTERNATIONAL LAW AND RELATIONS

121. ELEMENTS OF INTERNATIONAL RELATIONS.—Analysis of international politics, of foundations of national power, and of international cooperation, with emphasis upon attempted solutions of the central problems of international security. 3 s.h. (E & W) PROCTOR AND KEARNEY

122. MODERN INTERNATIONAL POLITICS.—An examination of the major problems of post-war international politics with particular attention to the extension of Soviet power, the Western response to this challenge, and the revolutions in the Afro-Asian world. 3 s.h. (E & W) BALL, KULSKI, AND PROCTOR

124. THE NEW STATES OF AFRICA IN WORLD AFFAIRS.—A study of the international political problems arising from the emergence of independent states in sub-Saharan Africa. 3 s.h. PROCTOR

158. CONTROL OF AMERICAN FOREIGN POLICY.—A consideration of the forces which are responsible for the formulation of American foreign policy, and a study of the important factors which have influenced contemporary United States policy in the major areas of the world. The course includes an analysis of the respective roles of the President, Congress, Department of State, and the United Nations, as well as military and public opinion. 3 s.h. (w) PIPER

221. INTERNATIONAL PUBLIC ORGANIZATION.—A study of the structure and functioning of the United Nations organs, of related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 s.h. (w) WILSON

227-228. INTERNATIONAL LAW.—Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 s.h. (w) WILSON

## INDEPENDENT READING AND UNDERGRADUATE SEMINAR

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. (See page 36).

197, 198. SENIOR SEMINAR IN POLITICAL SCIENCE.—A seminar concerned with the development of political science as a discipline, present frontiers of knowledge and research methods. A common problem will be explored and individual papers will be required on selected aspects of that problem. Required of all majors participating in the departmental honors program. Open only to Seniors. Prerequisite: Consent of the instructor. 6 s.h. (w) STAFF

## DEPARTMENTAL MAJOR

*Prerequisite:* Science 11-12 or 61-62.

*Major Requirements:* Eighteen semester hours of work in the Department above courses 11-12 or 61-62, including at least nine semester hours of 200 courses.

*Related Work:* Six hours each in two departments approved by the Political Science adviser. Courses may not be those primarily open to freshmen. Usually

related work is taken in the departments of history, economics, sociology or philosophy.

The Department offers work leading to graduation with distinction. See the section on Honors.

## PSYCHOLOGY

PROFESSOR ZENER, CHAIRMAN; PROFESSOR JONES, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS ADAMS, ALEXANDER, DAI, DIAMOND, GUTTMAN, KIMBLE, KOCH; ASSOCIATE PROFESSORS BANHAM, BONEAU, BORSTELMANN, BREHM, MCHUGH, REICHENBERG-HACKETT, WALLACH; VISITING ASSOCIATE PROFESSOR SCHÖNBACH; RESEARCH ASSOCIATE PROFESSOR GAFFRON; ASSISTANT PROFESSORS ALTROCCHI, CARSON, ERICKSON, KREMEN, LAKIN, OBRIST, SCHIFFMAN; LECTURERS COHEN, CROVITZ, GEHMAN, PEELE, SHMAVONIAN; INSTRUCTOR HINMAN

Psychology 91 or its equivalent is a prerequisite for all other courses in psychology. Six semester hours in psychology (including Psychology 91) or special permission of the course instructor or the Director of Undergraduate Studies are required for admission to Psychology 142, 144, 145, 147, 148, 203, 204, 210, 213, 214, 215, 216, 217, 218, 225, 233, 236, 237, 242, 245, 246, 265, 266, 292.

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of psychology through a study of motivation, emotions, perception, sensation, thinking, memory, learning, social behavior, individual differences, and personality. 3 s.h. (E & W) STAFF

100. PERSONALITY AND SOCIAL BEHAVIOR.—A survey of basic psychological principles underlying the study of personality in relation to the social environment. Among the topics discussed are theories of personality, the process of socialization of the individual, factors influencing adjustment to the social environment, the interaction of culture and personality. 3 s.h. (W) ALEXANDER, ALTROCCHI, AND KREMEN

Not open to students who have had Psychology 116.

101. INTRODUCTORY SOCIAL PSYCHOLOGY.—A survey of problems, concepts and methods in the study of social relations and group behavior. Topics to be discussed include: Psychological and socio-cultural factors in the development of motives, values and attitudes; the study of small-group behavior with emphasis on social influence and communication; prejudice and stereotypy. 3 s.h. (E & W) JONES AND BREHM

104. COMPARATIVE PSYCHOLOGY.—An examination of the bearing upon general psychological theory of experimental investigations of animal behavior in the fields of motivation and learning. 3 s.h. (W) ADAMS

108. INTRODUCTION TO BIOLOGICAL PSYCHOLOGY.—The application of biological principles to the study of psychology. Among the concepts considered are species, gene, homeostasis, internal environment, reflex, synapse, organ, and receptor specificity. The topic of phylogeny of the cortex will be treated in some detail. Prerequisite: Zoology 1-2 and Comparative Anatomy, or permission of the instructor. 3 s.h. (W) DIAMOND

110. APPLIED PSYCHOLOGY.—Applications of psychology to problems of personnel selection, industrial efficiency, advertising and selling, and other problems of practical interest. 3 s.h. (W) MCHUGH

111. ADVANCED GENERAL PSYCHOLOGY.—A more intensive study of several selected problem areas in the field of general psychology with special emphasis on experimental methods and findings in the areas considered. 3 s.h. (W) KIMBLE

112. PHYSIOLOGICAL PSYCHOLOGY.—An examination of the biological bases of behavior, considering the functions of the sensory and motor components of the nervous system as well as the problems of emotion, motivation, and consciousness. Prerequisite: Physics 1-2 or Chemistry 1-2 or permission of instructor. 3 s.h. (W) ERICKSON

116. PSYCHOLOGY OF ADJUSTMENT.—The course is planned to give an

adequate understanding of problems of adjustment and mental hygiene. Lectures and discussions cover an application of the principles and findings of normal and abnormal psychology, as these relate to the adjustment of the average individual in our changing society. 3 s.h. (w) REICHENBERG-HACKETT

Not open to students who have had Education 68 or Psychology 100.

117. STATISTICAL METHODS IN PSYCHOLOGY.—Elementary statistical techniques and their application to the analysis and interpretation of psychological data. Theory of inference is stressed. 3 s.h. (w) BONEAU AND SCHIFFMAN

118. EXPERIMENTAL METHODS IN PSYCHOLOGY.—The procedures and methods of human and animal experimentation in such areas as learning, motivation, and perception. 3 s.h. (E) STAFF

121. CHILD PSYCHOLOGY.—A survey of theory and research on growth and behavior from infancy to adolescence, with special emphasis upon personality and cognitive development. 3 s.h. BORSTELMANN AND MCHUGH

122. ADJUSTMENT OF THE PRE-SCHOOL CHILD.—Study and application of techniques of observing, recording and interpreting the behavior of the pre-school child. The course is designed to meet the needs of students interested in the personality, development and social adjustment of children. One hour lecture and 4 hours laboratory. 3 s.h. (E) REICHENBERG-HACKETT AND MISS HINMAN

126. ADOLESCENT PSYCHOLOGY.—The mental, social and emotional development of adolescence and youth will be studied, with special attention given to such topics as interests, motivations, home problems, sex differences, recreation, delinquency, and development for citizenship. Prerequisite: Psychology 121 or Education 118, or permission of the instructor. 3 s.h. (E) MCHUGH

130. PRINCIPLES AND METHODS OF PSYCHOLOGICAL EVALUATION.—This is an introductory course in test methods used by psychologists in measuring and evaluating mental processes. The nature, purposes and utilization of various types of tests and psychological techniques will be discussed and demonstrated. Among the tests to be studied will be standard scales of intelligence; tests of special abilities, aptitudes, attitudes and interests; personality tests, rating scales and projective methods. Prerequisite: 6 s.h. in Psychology. 3 s.h. (w) BANHAM

132. THE PSYCHOLOGY OF INDIVIDUAL DIFFERENCES.—A study of the nature and causes of individual and group variations in intelligence, special abilities, social and emotional characteristics. These will be considered in relation to developmental sequence, aging factors, sex, race, biological inheritance, education and socio-economic conditions. Prerequisite: Psychology 130 or permission of instructor. 3 s.h. (w) BANHAM

141. PERSONALITY AND BEHAVIOR DISORDER.—Behavior disorder studied from the viewpoint of the psychological principles underlying the adjustment of the deviant personality. Prerequisite: Psychology 100. 3 s.h. (w) ALTROCCHI, CARSON, AND LAKIN

142. INSTRUMENTAL BEHAVIOR.—A laboratory course using animal subjects in operant conditioning situations. Class members carry out a series of observations on conditioning, discrimination, motivation, and other basic phenomena. 3 s.h. (w) GUTTMAN

144. THE PSYCHOLOGY OF LEARNING.—A survey of the basic facts and principles of human and animal learning. Students in the course will perform an independent experiment. Prerequisite: 6 s.h. in psychology or permission of the instructor or Director of Undergraduate Studies. 3 s.h. KIMBLE AND BONEAU

145. EXPERIMENTAL APPROACHES TO PERSONALITY.—Experimental methods applied to personality research with emphasis upon psychological studies in such areas as anxiety, conflict and frustration. Students will perform a series of representative experiments. Prerequisite: 6 s.h. in psychology or special permission of the instructor or the Director of Undergraduate Studies. 3 s.h. (w) WALLACH

147. EXPERIMENTAL SOCIAL PSYCHOLOGY.—Intensive consideration of selected problems in group dynamics, attitude change, and interpersonal percep-

tion. Current research and theory are stressed. Class members conduct individual research projects. Prerequisite: Psychology 101 or permission of the instructor. 3 s.h. (w) BREHM AND JONES

148. PSYCHOLOGY OF PERCEPTION AND THINKING.—A study of the basic phenomena of perception and thinking as determined by conditions in the external situation and in the person, biological and psychological. Students will perform representative experiments. 3 s.h. (w) ZENER AND CROVITZ

151. PSYCHOLOGY AND INTERNATIONAL RELATIONS.—This course will explore the application of psychological theories to problems of international relations including those concerned with inter-group conflict and its resolution, group identification and ethnocentrism, and the complexities of national character. The course will be problem oriented and conducted on a seminar basis. Theoretical papers and experimentation along the lines of topics mentioned above will be expected. Prerequisites: Psychology 91, 100 or 101, and consent of the instructors. BONEAU AND LAKIN

203. PSYCHOLOGY OF PERCEPTION.—An examination of current systematic formulations with emphasis upon the intensive analysis of a variety of representative investigations. 3 s.h. ZENER

204. COMPARATIVE PSYCHOLOGY.—The study of behavior as related to species and of speciation as dependent upon behavior; instinct, imprinting and learning at different phylogenetic levels. 3 s.h. ADAMS

207, 208. INDEPENDENT STUDY AND RESEARCH.—Independent investigations of topics of special interest. Admission requires formulation of a study plan with a faculty supervisor and approval of the Director of Undergraduate Studies. Prerequisite: 9 s.h. of Psychology. 6 s.h. (E & W) BREHM AND STAFF

210. COGNITION AND HIGHER MENTAL PROCESSES.—An intensive analysis of the literature on thinking, problem solving, creativity, language, and related topics. Emphasis is upon the functional significance of these aspects of intellectual activity and upon the experimental methodology involved in their study. 3 s.h. BONEAU

213, 214. CONDITIONING AND LEARNING.—A survey of the literature on classical and instrumental conditioning and other forms of simple learning. Emphasis is on classical conditioning in 213 and on instrumental behavior in 214. 6 s.h. KIMBLE AND GUTTMAN

215. DEVELOPMENTAL PSYCHOLOGY.—A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. Prerequisite: special permission of the instructor. 3 s.h. BORSTELMANN

216. BIOLOGICAL PSYCHOLOGY.—The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy, nad genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potential, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 s.h. DIAMOND

217. RESEARCH METHODS IN SOCIAL PSYCHOLOGY.—Presents the theory and practice of data collection methods in social psychology. Emphasis is on the interplay between design and technique. The methods covered include formal scaling procedures, systematic observational techniques and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 s.h. BREHM

218. SOCIAL PSYCHOLOGY.—An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 s.h. JONES

225. PERSONALITY AND EXPERIMENTAL DYNAMICS.—Application of experimental methods to the study of psychodynamics, personality development, and behavior pathology. Stress is on research in early experience and its influence on

personality, frustration, conflict, anxiety, and the mechanisms of defense and adaptation. 3 s.h. STAFF

229, 230. INTRODUCTION TO RESEARCH.—A senior research seminar for advanced students. The student conducts an original investigation under staff supervision. A formal written report of the study will be required. Group discussions of significant research areas. Prerequisites: Participation by departmental invitation only; restricted to senior majors who have maintained a B average in all courses. Students graduating with distinction in psychology will be selected from among registrants in this course. 6 s.h. (E) BREHM

233. PERSONALITY AND COGNITIVE PROCESSES.—Deals with experimental approaches to expressive behavior, defense mechanisms, the measurement of motives, and stylistic differences in thinking, memory, and perception. 3 s.h. WALLACH

234. SEMINAR IN PERSONALITY.—3 s.h. WALLACH

236. THEORETICAL PSYCHOLOGY.—This course will be devoted to the analysis of techniques of theory construction in psychology. The discussion of these methodological issues will be coordinated with the analysis of concrete formulations in contemporary psychological theory. Prerequisite: 6 s.h. in psychology or special permission of the instructor or the Director of Undergraduate Studies. 3 s.h. (E) KOCH

237. FUNCTIONAL NEUROPHYSIOLOGY.—Considers the mechanisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural systems, and the integrative and associative functions of the nervous system. Laboratory demonstrations and participation. Permission of the instructors. 3 s.h. ERICKSON

238. THE ELECTROENCEPHALOGRAM AND PSYCHOLOGICAL FUNCTION.—A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, reaction time, and attention. Special emphasis is placed on the electrophysiology of conditioning and learning. Lectures, laboratory demonstrations and clinical case presentations. 3 s.h. OBRIST

245, 246. PERSONALITY THEORY AND ASSESSMENT.—An examination of representative models of human functioning from Freud to the present day. Included are examples from psychoanalytical, field theoretical and behavioristic approaches. Laboratory sessions will be concerned with personality assessment of normal human subjects over time. Interview and testing procedures will be introduced and the data gathered assessed against the theoretical models studied. 6 s.h. ALEXANDER

253, 254. PERSONALITY DEVELOPMENT.—3 s.h. BORSTELMAN AND STAFF

265. FUNDAMENTAL STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—Introduction to probability and the use of statistics in description and hypothesis testing in psychology including the following applications: correlational techniques, chi-square and t tests, distribution-free tests and one-way analysis of variance. Prerequisite: Psychology 117-118 or equivalent. 3 s.h. BONEAU

266. ADVANCED STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—The basic theory and application of analysis of variance techniques to complex experimental designs will be covered. Additional advanced techniques, including factor analysis, will be introduced. Prerequisite: Psychology 265 or equivalent. 3 s.h. BONEAU

292. HISTORY OF PSYCHOLOGY.—The history of psychology, particularly in the experimental period of the past century and of its involvement in biology since Darwin. 3 s.h. ADAMS

## DEPARTMENTAL MAJOR

*Prerequisite:* Psychology 91 or equivalent.

*Major Requirements:* For A.B. degree, 24 semester hours in psychology, including Psychology 91 and 117.

For B.S. degree, 24 semester hours in psychology, including Psychology 91, 108 or 112, 117, and a minimum of two courses numbered above 140.

*Related Work:* 18 semester hours which may include certain courses in chemistry, economics, education, English, linguistics, mathematics, philosophy, physics, political science, sociology-anthropology and zoology.

The Department offers work leading to graduation with distinction. See the section on Honors.

## RELIGION

PROFESSOR PRICE, CHAIRMAN; ASSISTANT PROFESSOR WHITE, DIRECTOR OF UNDERGRADUATE STUDIES; ASSOCIATE PROFESSOR OSBORN, SUPERVISOR OF FRESHMAN INSTRUCTION; ASSOCIATE PROFESSORS BAKER, BRADLEY, JONES, PHILLIPS, AND POTEAT; ASSISTANT PROFESSORS DANIELS, EFIRD, LANGFORD, MCCOLLOUGH, SULLIVAN, AND WINTERMUTE; DR. CRESSON; MESSRS. CROSSLEY, EAKIN, AND STASSEN

The purpose of the undergraduate program of instruction in religion is to make the students aware of the influence of religion in the history of mankind and in the contemporary world, and to help him appreciate its significance in his own experience. Attention is centered on the Bible, the history and thought of Christianity, and the development of other religious traditions. In addition to the basic courses designed to fulfill the University requirement in religion, advanced courses are offered to meet the needs of specially interested students. In every case the student is encouraged to consider carefully his own religious convictions, to the end that he may reach a more intelligent understanding of his rôle in the world and of his relation to God.

Students who have fulfilled the uniform course requirement in religion are eligible to elect any course numbered 100 or above, except those for which additional prerequisites are prescribed. Courses numbered below 100 may not be taken by those who have completed the uniform course requirements in religion.

1-2. THE ENGLISH BIBLE.—A comprehensive survey of the books of the Old and New Testaments. The literature is examined in the light of its origin in the history and religion of the people of the Bible, in order that its theological significance in its own day and in ours may be understood. Open only to freshmen. 6 s.h. STAFF

51-52. THE ENGLISH BIBLE.—A survey of the Old and New Testaments, similar to Religion 1-2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1-2. 6 s.h. STAFF

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 3 s.h. STAFF

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to his contemporary significance. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 121. 3 s.h. PHILLIPS

85. INTRODUCTION TO CHRISTIAN ETHICS.—An analysis of the Biblical and theological bases for an understanding of man's moral situation, with a study of the social implications of Christianity in selected problem areas. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 152. 3 s.h. MCCOLLOUGH

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development

and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 175. 3 s.h. BRADLEY AND SULLIVAN

100. PRINCIPLES OF INVESTIGATION.—An introduction to the resources and methods appropriate to advanced study in Religion. Required of all majors; open to others. 1 s.h. JONES AND WHITE

111. THE PROPHETS OF THE OLD TESTAMENT.—A study of the origin and rise of the prophetic movements, the message of the prophets in their historical setting, the contributions of this movement to the Biblical view of God and history, and the significance of the prophets for today. 3 s.h. WINTERMUTE

121. THE MISSION AND MESSAGE OF JESUS.—An analysis and interpretation of the Gospels, designed to afford the student a fuller understanding of Jesus and his mission. Not open to students who have received credit for Religion 65. 3 s.h. DANIELS AND PRICE

123. THE LIFE AND LETTERS OF PAUL.—A study of the available sources for the life of Paul, his rôle in the expansion of the Christian movement, the most important aspects of his thought, and his continuing influence. 3 s.h. DANIELS

124. THE EARLY CHURCH FROM PAUL TO IRENAEUS.—Early Christian history through the second century. Special attention is given to Christianity's relation to Rome, and to the developing organization, ministry, and theology of the Church. 3 s.h. PRICE

131. HISTORY OF CHRISTIANITY FROM THE EARLY CHURCH THROUGH THE REFORMATION.—A study of events, trends, personalities, and interpretations that have shaped Christianity from the time of the early Church through the sixteenth century, intended to acquaint the student with the Christian heritage and to contribute to his understanding of contemporary Christianity. 3 s.h. BAKER

133. HISTORY OF CHRISTIANITY SINCE THE REFORMATION.—A study of events, trends, personalities, and interpretations which have shaped Christianity since the Reformation, with emphasis upon those which contribute to an understanding of the contemporary religious situation. 3 s.h. BAKER

135. CHRISTIAN BIOGRAPHY.—A study of the development of Christian thought and practice as reflected in the lives and writings of such key persons as Augustine, Luther, and Wesley. 3 s.h. BAKER AND WHITE

137. PROTESTANTISM IN AMERICA.—A study of representative men, movements, and thought in American Protestantism to 1918. 3 s.h. JONES

138. CONTEMPORARY RELIGIONS IN THE UNITED STATES.—Judaism, Catholicism, and Protestantism are studied with reference to their distinctive beliefs and practices. A comparison is made of common and dissimilar features. 3. s.h. PHILLIPS

140. CHRISTIAN BELIEFS.—An introductory study of important Christian teachings concerning God, Jesus Christ, sin and salvation, etc., intended to serve as a basis for the student's evaluation of his own religious concepts. 3 s.h. LANGFORD AND MCCOLLOUGH

144. PROBLEMS OF RELIGIOUS THOUGHT.—A study of the relation of belief in God to various other types of knowledge and experience, such as the research of natural and social scientists and the facts of suffering, human tragedy, and evil. 3 s.h. LANGFORD AND POTEAT

149. CURRENT INTERPRETATIONS OF CHRISTIANITY.—Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 3 s.h. OSBORN

152. CHRISTIAN ETHICS.—A systematic study of the ethical implications of Biblical religion. Attention is given both to the historical development of the Christian ethic and to the responsibility of the Christian in the various aspects of contemporary social life, such as marriage, the state, race, etc. Not open to students who have received credit for Religion 85. 3 s.h. MCCOLLOUGH

156. CHRISTIAN MARRIAGE AND THE FAMILY.—Marriage and the family in American society studied from the Christian perspective. Attention will be given to the teachings of the churches and of psychologists and sociologists concerning courtship and marriage, sex, parent-child relationships, mixed marriages, and divorce. 3 s.h. PHILLIPS

160. CHRISTIAN EDUCATION.—A study of the educational work of the Church, with emphasis upon the philosophy, objectives and functions of Christian education. 3 s.h. DANIELS

171. RELIGIONS OF THE ANCIENT NEAR EAST.—The history and literature of religions in the cultures of Egypt, Mesopotamia, Persia, and Palestine from earliest times to 600 B.C. 3 s.h. WINTERMUTE

172. RELIGIOUS QUESTS OF THE GRECO-ROMAN WORLD.—The religious movements in the Hellenistic age, including sectarian Judaism, Persian dualism, the mystery cults, and Gnosticism. 3 s.h. WINTERMUTE

175. NON-CHRISTIAN RELIGIONS OF THE MODERN WORLD.—An examination of the beliefs of Islam and the religions of India, China, and Japan. Emphasis will be placed upon the sacred literature, world view, history, and cultural and social significance of the principal non-Christian religions. Not open to students who have received credit for Religion 93. 3 s.h.
BRADLEY AND SULLIVAN

179. MYSTICISM: SACRED AND PROFANE.—Varieties of mystical experience, both religious and non-religious; representative mystics in Hinduism, Islam, Christianity, and Mahayana Buddhism; the nature and significance of mysticism within these traditions. Prerequisite: Religion 93 or 175. 3 s.h. SULLIVAN

187. RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE.—A consideration of the religious insights, explicit and implied, in representative writings. 3 s.h. WHITE

189. MAN IN MODERN PROPHETIC THOUGHT.—The individual and society in the writings of Kierkegaard, Nietzsche, and Berdyaev. 3 s.h.
MCCOLLOUGH

191, 192. INDEPENDENT STUDY.—Directed reading and research. Open only to highly qualified students in the junior year, by permission of the department. 3 s.h. maximum per semester

193, 194. INDEPENDENT STUDY.—Directed reading and research. Open only to highly qualified students in the senior year, by permission of the department. 3-6 s.h. maximum per semester.

195-196. HONORS RESEARCH.—The first semester is a seminar in which methods of research are applied to selected problems in religion; in the second semester, independent research projects are reported to the class, and eventuate in research papers. Normally taken in the junior year. 6 s.h. PRICE

*Senior Seminars.* The following seminars parallel the five categories of courses offered in the department. They afford opportunities for more intensive reading and individual research. Each major must take one of these courses in his senior year; they are open also to qualified non-majors. To be eligible for a seminar the student (major or non-major) must have completed at least one course in this area or pass the qualifying examination on the departmental reading list in that category. Each seminar will be offered as frequently as student demand and available personnel permit.

203. BIBLICAL STUDIES.—3 s.h.

204. CHURCH HISTORY.—3 s.h.

205. THEOLOGY AND ETHICS.—3 s.h.

206. CHRISTIANITY AND CULTURE.—3 s.h.

207. HISTORY OF RELIGIONS.—3 s.h.

228. THE THEOLOGY OF THE GOSPEL AND THE EPISTLES OF JOHN.—A study of the origin of these writings, the provenance of their thought forms and symbolism, their influence on the early Church, and their contemporary significance. Prerequisite: permission of the instructor. 3 s.h. PRICE

248. THE THEOLOGY OF KARL BARTH.—An historical and critical study of the theology of Karl Barth. Prerequisite: permission of the instructor. 3 s.h. OSBORN

260. WESLEY STUDIES.—The lives and thought of John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Prerequisite: permission of the instructor. 3 s.h. BAKER

270. THE RELIGION OF THE HINDUS.—Hinduism studied through its religious literature from the Vedic period to modern times. Attention will center on ways of salvation in philosophical and epic literature, heresies and sects, Muslim influences, and the role of religion in modern India. Prerequisite: permission of the instructor. 3 s.h. BRADLEY

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as History 285.) Prerequisite: permission of the instructor. 3 s.h. SULLIVAN

272. ORIGINS OF INDIAN CIVILIZATION.—A study of the formation of the classical civilization of the Indian subcontinent from the prehistoric Indus Age to the Gupta Period (4th century A.D.). Attention will be given to the development of political, economic, social and religious movements and institutions. 3 s.h. SULLIVAN

### DEPARTMENTAL MAJOR

*Prerequisite:* Completion of the uniform course requirement in religion. (The sequence Religion 1-2 or 51-52 is recommended.)

*Major Requirements:* Twenty-five semester hours selected as follows:

A. Religion 100 (to be taken in the semester after becoming a major).
B. Three hours from each of the following categories: (A major may fulfil, without credit, the requirement in any one of these areas by passing the departmental examination on the basic book list for that category).
   1. Biblical studies: 111, 121, 123, 124, 228
   2. Church history: 131, 133, 135, 137, 138, 260
   3. Theology and ethics: 140, 149, 152, 156, 248
   4. Christianity and culture: 144, 187
   5. History of religions: 171, 172, 175, 179, 270
C. A three hour senior seminar in one of the five categories.
D. At least six hours elected from the departmental curriculum.

*Related Work:* Eighteen semester hours, including a minimum of six hours in each of two departments. There is no restriction in principle as to departments in which related work may be taken. The departmental major adviser will take into consideration the vocational objective of the student and the need to select courses which will strengthen his major work.

The Department offers work leading to graduation with distinction which is normally begun in the junior year. See the section on graduation with distinction in this *Bulletin*.

## ROMANCE LANGUAGES

PROFESSOR DAVIS, CHAIRMAN; PROFESSOR DOW, DIRECTOR OF UNDERGRADUATE STUDIES IN FRENCH; PROFESSOR FEIN, DIRECTOR OF UNDERGRADUATE STUDIES IN SPANISH; ASSOCIATE PROFESSOR CORDLE, SUPERVISOR OF FRESHMAN INSTRUCTION IN FRENCH; ASSOCIATE PROFESSOR TORRE, SUPERVISOR OF FRESHMAN INSTRUCTION IN SPANISH; PROFESSORS CASTELLANO, CHERPACK, PREDMORE, AND WARD-ROPPER; ASSOCIATE PROFESSORS GRANT AND VINCENT; ASSISTANT PROFESSORS BARLOW, BUSH, CASTELLANO, DOW, FLINT, HULL, MILLER, RIPLEY, TÉTEL, AND WALKER; INSTRUCTORS DANIEL, GOODHAND, PERRY, AND WINECOFF; BATTLE, GLENN, GOODE, TERRY, MRS. BRYAN, MRS. GRANT, MRS. HULL, AND MISS UPCHURCH

French 63-64 and Spanish 63-64 are the prerequisites for all elective courses.

Students who, by reason of foreign residence, have had special opportunities in French or Spanish must be classified by the Director of Undergraduate Studies.

## FRENCH

1-2. ELEMENTARY FRENCH.—Introduction to understanding, speaking, reading, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & W)
GRANT AND STAFF

63-64. INTERMEDIATE FRENCH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or two years of high-school French. 8 s.h. (E & W)
WALKER AND STAFF

91, 92. INTRODUCTION TO FRENCH LITERATURE.—Readings from representative French authors. Development of skill in rapid reading correlated with discussion in French of content and ideas. Prerequisite: French 63-64 or equivalent. 6 s.h. (E & W) CHERPACK AND STAFF

94. FRENCH LITERATURE AND MUSIC IN THE NINETEENTH AND TWENTIETH CENTURIES. COMMON DENOMINATORS IN ARTISTIC CREATION.—Developments in literature and music from the end of the classical period to the present. Readings from Chateaubriand, Hugo, Balzac, Baudelaire, Mallarmé, Becket, and others. Compositions of Beethoven, Berlicz, Debussy, Messiaen, and Boulez. May be substituted for French 92 to satisfy minimum uniform requirements. Not open for credit to those who have completed French 92. 3 s.h. (W) HAMILTON (Department of Music) AND RIPLEY

97. SPOKEN FRENCH.—Intensive instruction in the spoken language: contemporary French prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: French 64. 3 s.h. (E)
MME. BRYAN, DOW, BUSH, AND GOODHAND

104. THE SIXTEENTH CENTURY.—An introduction to the spirit of the French Renaissance as reflected in the literature of the age of Rabelais and Montaigne, Ronsard and Du Bellay. 3 s.h. (E) VINCENT

106. THE WORLDS OF ROUSSEAU.—Studies of Rousseau's conception of the real world (the *Discours*), the ideal world (*Emile and the Contrat Social*), the fictional world (*La Nouvelle Héloïse*), and his personal world (the *Confessions* and the *Rêveries*). 3 s.h. (E) CHERPACK

107. THE WORLDS OF VOLTAIRE.—Studies of Voltaire's conception of the real world (historical, philosophical, and satirical writings), his aesthetic world (poetry, drama, criticism), and his personal world (correspondence). 3 s.h. (E)
CHERPACK

108. FRENCH ROMANTICISM.—The beginnings of the modern era, in its quest for new values and a new expression, as studied through the great lyric poets and prosodists of the first half of the nineteenth century. Readings from Chateaubriand, Lamartine, Musset, Hugo, Vigny and others. 3 s.h. (E) GRANT AND RIPLEY

109. TOWARD MODERNISM IN FRENCH POETRY.—An introduction to modern trends in the nineteenth century: emergence from traditional Romanticism; Art for Art's Sake and the Parnassians (Gautier, Leconte de Lisle); the transition from Decadence to Symbolism (Baudelaire, Verlaine, Rimbaud, and Mallarmé). 3 s.h. (E) BARLOW

111. FRENCH DRAMA OF THE NINETEENTH CENTURY.—A survey of the French theatre from the Romantic period to the *Théâtre libre*. 3 s.h. (E) DOW

112. FRENCH DRAMA OF THE TWENTIETH CENTURY.—Reading of representative plays selected from the works of Bernstein, Maeterlinck, Romains. Sarment, Vildrac, J.-J. Bernard, Claudel, Lenormand, Pagnol, Giraudoux, Anouilh, and others. 3 s.h. (E) DOW

113. THE CLASSICAL IDEAL.—The cultural hegemony of France in seventeenth century Europe. The classical masterpieces as the rational focus of her

vigorous thought and art. Descartes, Pascal, Corneille, Racine, Molière, and others. 3 s.h. (E) WALKER

127, 128. ADVANCED COMPOSITION AND CONVERSATION.—During the first semester elements of syntax are briefly reviewed, along with constant drill in the conversational idiom. In the second semester, there are exercises in free composition with intensified treatment of pronunciation and diction. 6 s.h. (E) MRS. DOW, TÉTEL, AND VINCENT

130. TWENTIETH CENTURY FRENCH POETRY.—In the wake of symbolism: Valery and Claudel; poetry as ritual: Peguy; Appollinaire on Surrealist poetry; the contemporary movement: Michauz, Char, Saint-John Perse. 3 s.h. FOWLIE

134. CONTEMPORARY FRENCH LIFE AND THOUGHT.—An introduction to the essential currents in French thought since 1895. Representative literary works are used as a basis for analysis and discussion of the contemporary scene. 3 s.h. (W) CORDLE AND BUSH

181-182. INTRODUCTION TO FRENCH.—Intensive introduction to the language. Modern readings. Open only to students in the Honors-Masters program who have completed the second college year of another foreign language. 3 s.h. RIPLEY

191, 192. INDEPENDENT STUDY.—Open only to highly qualified juniors by permission of the Department. See page 36.

193, 194. INDEPENDENT STUDY.—Open only to highly qualified seniors by permission of the Department. See page 36.

209. ADVANCED COMPOSITION AND SYNTAX.—A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 s.h. (W) HULL

210. FRENCH PHONETICS.—The phonemic structure of contemporary French. Sounds, intonation. Practice in transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 s.h. (W) HULL

213. FRENCH CLASSICISM.—Its initial phase. Readings from Malherbe, Balzac, Voiture, Descartes, Corneille, Molière, and others. 3 s.h. (W) CHERPACK

214. FRENCH CLASSICISM.—Its maturity. Readings from Pascal, Racine, La Fontaine, La Rochefoucauld, Boileau, Bossuet, Madame de Sévigné, La Bruyère, Saint-Simon, and others. 3 s.h. (W) CHERPACK

219. OLD FRENCH LITERATURE.—An introduction to the reading of medieval French literary texts. 3 s.h. (W) VINCENT

221. THE NINETEENTH CENTURY FRENCH NOVEL.—The initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 s.h. (W) GRANT

222. THE NINETEENTH CENTURY FRENCH NOVEL.—A continuation of 221. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 s.h. (W) GRANT

225, 226. FROM RENAISSANCE TO BAROQUE IN FRENCH LITERATURE OF THE SIXTEENTH CENTURY.—First semester: literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: poetry and theater. Readings from Marot, Scève, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. 6 s.h. (W) TÉTEL

241, 242. FRENCH LITERATURE AND THOUGHT IN THE AGE OF ENLIGHTENMENT.—First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: the crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 s.h. (W) CHERPACK

245. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—The

metamorphoses of Symbolism. A study of the work of Proust, Gide, and Claudel. 3 s.h. (W) CORDLE

246. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—The Existentialist conversion. A study of the work of Malraux, Sartre, and Camus. Extensive readings from the varied works of the three writers. 3 s.h. (W) CORDLE

## ITALIAN

181-182. ITALIAN.—Intensive introduction to the language. Modern readings. Completion of the second college year of another foreign language will normally be required as a prerequisite. 6 s.h. (E) TÉTEL

283. DANTE: LA DIVINA COMMEDIA.—Explication of the poem with particular attention to literary structure. Reading in Italian or English. 3 s.h. WILLIAMSON

## PORTUGUESE

181-182. PORTUGUESE.—Intensive introduction to the language. Modern readings. Completion of the second year of another foreign language will normally be required as a prerequisite. 6 s.h. (W) MILLER

## SPANISH

1-2. ELEMENTARY SPANISH.—Introduction to understanding, speaking, reading, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & W) MILLER AND STAFF

63-64. INTERMEDIATE SPANISH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or two years of high-school Spanish. 8 s.h. (E & W) FLINT AND STAFF

91, 92. INTRODUCTION TO SPANISH LITERATURE.—Readings from representative Spanish authors. Development of skill in rapid reading correlated with discussion in Spanish of content and ideas. Prerequisite: Spanish 63-64 or equivalent. 6 s.h. (E & W) CASTELLANO AND STAFF

97. SPOKEN SPANISH.—Intensive instruction in the spoken language: contemporary Spanish prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Spanish 64. 3 s.h. (E) PREDMORE, FLINT, AND MILLER

156. REPRESENTATIVE WRITERS OF SPANISH AMERICAN LITERATURE.—Study of works which are examples of the principal literary currents after 1880, with particular reference to their relationship to social ideas and problems in the same period. 3 s.h. (E) FEIN

161. SPANISH LITERATURE OF THE RENAISSANCE AND THE BAROQUE.—A study of selected works of the sixteenth and seventeenth centuries with attention to their reflection of social, religious, and political ideas. 3 s.h. (E) DER HORST

162. SPANISH ROMANTICISM.—A study of the romantic spirit in modern Spanish literature. 3 s.h. (E) TORRE

163. THE GENERATION OF 1898.—A study of the "Spirit of 1898" with special emphasis on the novel and essay. The precursors: "Clarin" and Ganivet; Unamuno, Baroja, "Azorin," Valle-Inclan; influence on the next generation: influence of Perez de Ayala and Ortegay Gasset. 3 s.h. FLINT

164. SPANISH CIVILIZATION.—This course is designed to develop an understanding of the Spanish cultural heritage through the study of selected historical, literary and artistic materials. 3 s.h. (E) FLINT

165. ANALYSIS OF GREAT SPANISH AUTHORS.—A close textual study of a few literary texts with some consideration of methods of literary criticism. The

course is designed to give the student insight into various ways of interpreting and understanding literary works so that his experience of literature in general may be enriched. 3 s.h. (E) WARDROPPER

176. ADVANCED CONVERSATION.—This course is designed to develop facility of expression through constant drill on vocabulary and conversational idiom. Time will be devoted to a review of the essentials of Spanish syntax. Prerequisite: Spanish 97 or permission of the instructor. 3 s.h. (E) CASTELLANO

191, 192. INDEPENDENT STUDY.—Open only to highly qualified juniors by permission of the Department. See page 36.

193, 194. INDEPENDENT STUDY.—Open only to highly qualified seniors by permission of the Department. See page 36.

251. THE ORIGINS OF THE SPANISH NOVEL.—A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: *Amadís de Gaula,* Diego de San Pedro's *La cárcel de amor,* the *Abencerraje,* the *Lazarillo,* Montemayor's *Diana.* 3 s.h. (W) WARDROPPER

252. SPANISH LYRIC POETRY BEFORE 1700.—A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor, la poesia de tipo tradicional,* and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 s.h. (W) WARDROPPER

253. THE ORIGINS OF THE SPANISH THEATER.—A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century) through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres, Naharro, Lope de Rueda, Juan de la Cueva. 3 s.h. (W) WARDROPPER

255. MODERN LATIN AMERICAN LITERATURE.—The coming of age of Latin American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 s.h. (W) FEIN

256. CONTEMPORARY LATIN AMERICAN LITERATURE.—Trends in Latin American literature after the Modernist movement. Analysis of significant works in various genres. 3 s.h. (W) FEIN

258. OLD SPANISH LITERATURE.—An introduction to the reading of medieval Spanish literary texts. 3 s.h. (W) DAVIS

259. SPANISH PHONETICS.—A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. 3 s.h. (E) CASTELLANO

260. ADVANCED COMPOSITION AND SYNTAX.—Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. Prerequisites: Spanish 176 or permission. 3 s.h. (E) CASTELLANO

261. NINETEENTH CENTURY NOVEL.—A study of literary and social trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo, Bazán, Blasco Ibáñez, and their contemporaries. 3 s.h. (W) DAVIS

264. MODERN AND CONTEMPORARY SPANISH THEATRE.—A brief review of the modern and contemporary Spanish theatre from the period of Romanticism. Lectures, reading, and discussion of the most representative works of Benavente, Martínez Sierra, los hermanos Quintero, etc. 3 s.h. (E) CASTELLANO

265. GOLDEN AGE LITERATURE: CERVANTES.—The life and thought of Cervantes with special emphasis on his *Quijote.* 3 s.h. (W) PREDMORE

266. GOLDEN AGE LITERATURE: THE DRAMA.—A study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 s.h. (W) CASTELLANO

275. CONTEMPORARY SPANISH LITERATURE: ESSAY AND LYRIC POETRY.—A study of the revision of national values and literary expression in the

twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extrapeninsular influences. 3 s.h. (w)
PREDMORE

276. CONTEMPORARY SPANISH LITERATURE: NOVEL.—A study of tradition and innovation in the twentieth century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 s.h. (w)
PREDMORE

### ROMANCE LANGUAGES

RL 211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance Literature has been divided and studied, with analyses of selected texts. 3 s.h. (w) CHERPACK

RL 218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college level; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 3 s.h. (E) DOW

RL 224. ROMANCE LINGUISTICS.—The origin and development of the Romance languages from spoken Latin to the modern standard languages and local dialects. Introduction to the structural method as applied to historical and comparative linguistics. Prerequisite: French 219, Spanish 258, or permission of instructor. 3 s.h. (w) HULL

### DEPARTMENTAL MAJOR

*Prerequisites:* French or Spanish: 63-64 or equivalent.

*Major requirements:* For French:

2) 127 or 128
3) 209 or 210
4) A minimum of 15 hours of courses in literature including six hours above 200. All majors must take one of the following: 113, 213, 214.

For Spanish:

1) 97
2) 176
3) 259 or 260
4) A minimum of 15 hours of courses in literature including six hours above 200. All majors must take one of the following: 161, 251, 252, 253, 265, 266.

The Department offers work in the junior and senior years leading to graduation with distinction. See the section on Honors in this *Bulletin*.

### RELATED WORK

Majors in Romance Languages will select, with approval of the Director of Undergraduate Studies, appropriate courses from the following fields: (1) other languages and literature; (2) history; (3) philosophy; (4) appreciation courses in music and art; (5) linguistics; and occasionally from other fields deemed suitable.

## RUSSIAN

ASSOCIATE PROFESSOR JEZIERSKI; ASSISTANT PROFESSOR M. PAVLOV; ASSISTANT PROFESSOR H. PAVLOV, MR. DUDA; SWAN AND MISS SALVÉ

1-2. ELEMENTARY RUSSIAN.—Introduction to understanding, speaking, reading and writing. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (w) STAFF

63-64. INTERMEDIATE RUSSIAN.—Intensive classroom and laboratory practice in spoken and written patterns. Reading in contemporary literature. Prerequisite: Russian 1-2, or two years of high school Russian. 8 s.h. STAFF

91-92. ADVANCED RUSSIAN.—Systematic study of syntax and style in the written and spoken language. Readings of nineteenth and twentieth century

authors. Oral and written reports. Conducted in Russian. Prerequisite: Russian 63-64, or equivalent. 6 s.h. (w) PAVLOV

97, 98. SPOKEN RUSSIAN.—Intensive instruction in the spoken language: contemporary Russian prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Russian 92. 3 s.h. M. PAVLOV

101, 102. RUSSIAN LITERATURE AND CULTURE THROUGH THE NINETEENTH CENTURY.—Russian prose, poetry and criticism, with special attention to more recent periods. Readings (from *The Igor Tale* to Blok) in English. Lectures and class discussion. 6 s.h. (w) JEZIERSKI

103. SOVIET LITERATURE AND CULTURE.—Literature since 1917, as a continuation of nineteenth-century traditions and as a response to Soviet ideology. Readings (in English or Russian) from major works of prose, poetry and drama. 3 s.h. (w) JEZIERSKI

105. THE RUSSIAN THEATRE AND DRAMA.—Russian drama from its beginnings to contemporary practice. Lectures, class, discussions, readings of plays (Pushkin to Majakovskij) in English or Russian. 3 s.h. (w) JEZIERSKI

112. PUSHKIN AND THE BIRTH OF RUSSIAN REALISM.—An intensive study of the works of Russia's greatest poet. Readings in English or Russian. Prerequisite: Russian 101 or instructor's consent. 3 s.h. (w)

191, 192. INDEPENDENT STUDY.—Open only to highly qualified students by permission of the department. (See page 36.)

201, 202. THE NOVELISTS OF NINETEENTH CENTURY RUSSIA.—Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English or Russian. Lectures, oral reports, class discussions and term paper. 6 s.h. (w) JEZIERSKI

### DEPARTMENTAL MAJOR

*Prerequisite:* Russian 1-2

*Major Requirements:* Russian 63-64 and 18 semester hours in the department including 91-92 and at least 6 semester hours of senior-graduate courses.

*Related Work:* 18 semester hours chosen with the approval of the department from the humanities, history and the social sciences.

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR MCKINNEY, CHAIRMAN; ASSOCIATE PROFESSOR ROY, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BACK, LABARRE, AND THOMPSON; ASSOCIATE PROFESSORS KERCKHOFF, MADDOX, ROWE, PREISS, AND SMITH; ASSISTANT PROFESSORS SIMPSON, WHITRIDGE, AND WINSBOROUGH

Sociology 91 or 92, or the equivalent or special permission of the instructor or of the Director of Undergraduate Studies, is a prerequisite for all courses at the 100 and 200 levels, except 131, 132, 133, 192, 230, 232, 234, and 236.

91. INTRODUCTION TO SOCIOLOGY: CONCEPTS AND PROCEDURES.—Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. 3 s.h. (E & W) Open to Freshmen. STAFF

92. INTRODUCTION TO SOCIOLOGY: SOCIOLOGICAL STUDIES.—Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 3 s.h. (E & W) STAFF

93. GENERAL ANTHROPOLOGY.—Origins and distribution of mankind; a survey of human palaeontology and human biology, world archaeology, prehistory and languages; and the origins of the family, primitive economics, arts, social and political organization. Special attention is given to primitive people. 3 s.h. (W) LABARRE AND ROWE

94. CULTURAL ANTHROPOLOGY.—A study of the dynamics of culture, the

causal factors, functions, integration and disintegration, diffusion, growth and change of cultures. Emphasis is upon the simpler societies. 3 s.h. (w)
LABARRE AND ROWE

130. CULTURAL CHANGE AND STABILITY.—Contemporary theories of culture change, especially those resulting from acculturation and from implementation of programs of technical and economic aid; a consideration of the factors significant in maintaining stability or stimulating change in traditional cultures. 3 s.h. (w) ROWE

131. PEOPLES OF THE WORLD: AMERICAN INDIAN.—A comprehensive survey of the Indians of North and South America, including a study of origins and prehistory, archaeology, physical anthropology, languages, material culture, social and political organization, economics and religion, discussed in terms of the "culture area" concept. 3 s.h. (w) LABARRE

132. PEOPLES OF THE WORLD: AFRICA AND OCEANIA.—A comprehensive survey of the non-European peoples of Africa and Oceania, covering available prehistory, archaeology, racial affiliations, languages, material culture, social and political organization, economics and religion, discussed in terms of the "culture area" concept. 3 s.h. (w) LABARRE

133. PEOPLES OF THE WORLD: ASIA.—A comprehensive survey focusing on the peoples and societies of South, Southeast and East Asia, including the prehistoric, ethnic, linguistic, religious and political foundations of the complex civilizations; the response of traditional Indian, Chinese and Japanese cultures to the West. 3 s.h. (w) ROWE

137. COMPARATIVE SOCIAL STRUCTURES.—Social anthropological analysis of role structures and corporate groups in particular societies, and their relevance for understanding the historic process of civilization. Case study of social types and of the unique features of societies revealed by the comparative method. 3 s.h.
MCCORMACK

141. INTRODUCTION TO POPULATION AND HUMAN ECOLOGY.—Provides an introduction to two macroscopic aspects of society. Both the size, distribution, and composition of populations and the morphological aspects of collective life are considered. 3 s.h. FARLEY AND WINSBOROUGH

142. THE SOCIOLOGY OF MASS COMMUNICATION.—An analysis of the role of radio, the press, magazines, movies and television in modern societies. An examination of the selective audiences, content characteristics, controlling elements, and organizational structure of the various media of mass communication. 3 s.h. (w) SMITH

145. URBAN SOCIOLOGY.—Using historical, demographic, and ecological materials for background, urban society is studied with respect to its institutions, interactional patterns, differentiation, integration, disorganization, and decentralization. 3 s.h. (w) SMITH

146. INDUSTRY AND SOCIETY.—A study of industrial institutions in their interrelationships with other forms of social behavior in the broad cultural setting of western civilization. Attention will center upon analysis of specific social problems resulting from the impact of industrial change. 3 s.h. (w) ROY

150. THE FAMILY.—Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. (w) KERCKHOFF

153. SOCIOLOGY OF THE SOUTH.—The developing regional organization of the world economy studies with especial reference to Southern life. A survey of the composition and distribution of population, races and race relations. Primary emphasis is upon social change. 3 s.h. (w) THOMPSON

154. THE SOCIOLOGY OF THE ARTS.—An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations and art works as they function in their social-cultural milieux. 3 s.h. (E) WHITRIDGE

155. INTRODUCTION TO INDUSTRIAL SOCIOLOGY.—An analysis and appraisal of the various factors that affect human relations in industry. The interpersonal and intergroup relationships within the individual industrial unit which determine its efficiency as an economic and social institution and the social conditions in the community as they affect social relations. 3 s.h. (w) ROY

159. THE NEGRO IN AMERICA.—A study of the history and changing status of the Negro regarded as a symbol and protagonist of minority groups in America and elsewhere. 3 s.h. (w) THOMPSON

172. COLLECTIVE BEHAVIOR AND SOCIAL MOVEMENTS.—Examination of disruptive and relatively unorganized aspects of social phenomena such as crowd behavior, fads, rumors, crazes and social movements as indexes of social disequilibrium and potential sources of social change. 3 s.h. (w) KERCKHOFF

191. PRINCIPLES OF SOCIAL CASE INVESTIGATION.—A non-professional course designed to acquaint the students with the basic research techniques employed in the case study of the interrelationships of personality and culture in various fields of sociological and anthropological interest. 3 s.h. (E) WHITRIDGE

199. INDEPENDENT STUDY.—This course is designed to provide an opportunity for directed reading and research on selected sociological problems. Required of, but not restricted to, candidates for graduation with distinction in the department and normally taken in the senior year. Prerequisite: Consent of the instructor. 3 s.h. (w) STAFF

230. SOCIETY AND CULTURE IN INDIA.—The basic features of Indian cultures and societies from an anthropological perspective. The impact of selected technological and social changes upon the individual, caste, and community. 3 s.h. (w) ROWE

232. PRIMITIVE RELIGION.—The ethnography, the social functions, and the sociopsychological meanings of religion in primitive societies. 3 s.h. (w) LABARRE

234. PERSONALITY AND SOCIETY.—The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 s.h. (w) LABARRE

236. PERSONALITY AND CULTURE.—The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comparative anthropological materials will be drawn upon. Prerequisite: Course 234. 3 s.h. (w) LABARRE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political, and prestige structures in modern societies. The interrelationship of class, status, and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 s.h. (w) ROY AND SIMPSON

242. THE SOCIOLOGY OF OCCUPATIONS AND PROFESSIONS.—The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 s.h. (w) MCKINNEY

245. DEVIANT SOCIAL BEHAVIOR.—Analysis of deviant behavioral systems (illness, crime, delinquency, etc.) in terms of a) precipitating social factors, b) patterns and goals, c) remedial and counter-acting controls. 3 s.h. (w) PREISS

247. COMMUNITY AND SOCIETY.—This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, and news, mass behavior, social problems, races, and classes. 3 s.h. (w) THOMPSON

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function, and importance of institutions in society. 3 s.h. (w) THOMPSON AND SIMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as race and personal identity, the

geography and ecology of race relations, the idea of race, and race conflict. 3 s.h. (w) THOMPSON

275. SOCIAL ATTITUDES AND INDIVIDUAL BEHAVIOR.—The importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the importance of membership groups and reference groups. 3 s.h. (w) KERCKHOFF AND BACK

278. SOCIAL STRUCTURE AND THE LIFE CYCLE.—A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 s.h. (w) MADDOX

281. DEVELOPMENT OF SOCIOLOGICAL THEORY.—An analysis of the development, convergence, and utilization of sociological theory. Prerequisite: 15 s.h. credit in sociology. 3 s.h. (w) MCKINNEY AND PREISS

295. METHODOLOGY IN SOCIOLOGY.—Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 units. SMITH

297. STATISTICAL ANALYSIS IN SOCIOLOGY.—Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance, and covariance and factorial design are studied. When possible, analogous non-parametric techniques are also considered. Undergraduates must have at least 15 s.h. and a B average in sociology and obtain the permission of the instructor. 6 s.h. (w) WINSBOROUGH

### DEPARTMENTAL MAJOR

Senior-Graduate courses.

*Major Requirements:* Twenty-four semester hours of work in the Department including either or both Sociology 91 and 92 and at least six semester hours in the Senior-Graduate courses.

*Related Work:* A minimum of eighteen semester hours, at least twelve of which are normally chosen from two of the following fields: economics, education, history, political science, and psychology. Additional courses in other fields may also be elected as related work when indicated by the educational requirements of the student and approved by the Departmental adviser.

## ZOOLOGY

PROFESSOR HORN, CHAIRMAN; ASSOCIATE PROFESSOR BAILEY, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS BOOKHOUT, GRAY, GREGG, MENZIES, K. SCHMIDT-NIELSEN, WILBUR; ASSOCIATE PROFESSORS FLUKE, HUNTER, KLOPFER, LIVINGSTONE, ROBERTS, VERNBERG, AND WARD; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSOR COSTLOW; INSTRUCTORS BERGER, COURTENAY, HAINES, HURST, AND WHIPPLE

1. ANIMAL BIOLOGY.—The principles of biology as applied to animals. 4 s.h. (E & W) KLOPFER AND STAFF

2. GENERAL ZOOLOGY.—A survey of the animal kingdom. Prerequisite: Zoology 1. 4 s.h. (E & W) BOOKHOUT, MRS. HUNTER, AND STAFF

53. COMPARATIVE VERTEBRATE ANATOMY.—A study of the anatomy and evolution of the organ systems of vertebrates. Prerequisites: Zoology 1, 2. 4 s.h. (w) HORN AND STAFF

71. HEREDITY AND EUGENICS.—Effects of environment and heredity upon the individual and populations; intepretation of human genetic histories. Prerequisite: one year of zoology. 3 s.h. (w) WARD

92. GENERAL EMBRYOLOGY.—An introduction to the study of developmental processes. Prerequisite: Zoology 1, 2. Recommended Zoology 53. 4 s.h. (w) GREGG AND STAFF

103. PRINCIPLES OF ECOLOGY.—An introduction to the study of organisms in natural habitats, with particular attention to the growth of animal populations, the chemical role of organisms, energy flow through food chains, and the development of ecological systems through geologic time. Prerequisites: Botany 1, 2 or Zoology 1, 2; Mathematics 17 or 21. 4 s.h. (w) LIVINGSTONE

109. EVOLUTION.—Analysis of the processes of adaptation and evolution in individuals, populations, and genetic systems. Lectures and student reports. Prerequisite: Genetics or consent of the instructor. 3 s.h. (w) KLOPFER

110. INTRODUCTION TO GENETICS.—The principles and practical application of genetics. Prerequisite: one year of zoology or consent of instructor. 3 s.h. With laboratory—4 s.h. (w) WARD

120. ORNITHOLOGY.—Lectures, laboratory and field trips dealing with the classification, adaptations, and natural history of birds. Prerequisite: one year of zoology. Zoology 53 recommended. 4 s.h. (w) BAILEY

151. PRINCIPLES OF PHYSIOLOGY.—An introductory survey of physiological functions. Prerequisites: At least a year of zoology and a year of chemistry. 4 s.h. (w) K. SCHMIDT-NIELSEN

156. VERTEBRATE HISTOLOGY.—The microscopic structure of normal tissues and organs of the vertebrate body. Training will be given in the preparation of material for microscopic study. Prerequisite: Open only to juniors and seniors who have completed two years of zoology. 4 s.h. (w) ROBERTS

161. ANIMAL PARASITES.—An introductory course dealing with biological principles involved in parasitism of animals including man. Prerequisite: one year of zoology. 4 s.h. (w) MRS. HUNTER

196. SEMINAR: CURRENT DEVELOPMENTS IN ZOOLOGY.—Open to senior departmental majors. 2 s.h. (w) STAFF

197, 198. SPECIAL PROBLEMS.—Senior and Junior majors who have had proper training may be permitted to carry on special work. Permission must be obtained from the Director of Undergraduate Studies and the instructor under whom the student wishes to work. Not more than 4 s.h. may be counted toward major work. (w) STAFF

FOR SENIORS AND GRADUATES

201. ANIMAL BEHAVIOR.—A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: Physiology, Genetics and Evolution, or consent of instructor. 3 s.h.; 4 s.h. with laboratory. (w) KLOPFER

203. ECOLOGY.—Relation of animals to environment. Lectures, readings, reports, conferences; laboratory and field work. 4 s.h. (w) GRAY

210. EXPERIMENTAL GENETICS.—The relationship of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Prerequisites: Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent), or consent of instructor. 4 s.h. (w) WARD

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 4 s.h. (Given at Beaufort only.) MENZIES

216. LIMNOLOGY.—A study of lakes, ponds and streams, including their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities living in them. Lectures, field trips, and laboratory work. Usually offered in alternate years. Prerequisites: one year each of

biology, chemistry and physics, and mathematics 21; or permission of instructor. 4 s.h. (w) LIVINGSTONE

222. ENTOMOLOGY.—Anatomy, physiology, embryology, and classification of insects. Prerequisite: One year of zoology. 4 s.h. (w) GRAY

224. VERTEBRATE ZOOLOGY.—A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 s.h. (w) BAILEY

228. EXPERIMENTAL EMBRYOLOGY.—Lectures, readings, reports, and laboratory work. 4 s.h. GREGG

238. SYSTEMATIC ZOOLOGY.—The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisites: Zoology 1, 2. 4 s.h. (w) BAILEY

243. CYTOLOGY.—The structure of the cell. Lectures, readings, reports, and laboratory work. Prerequisites: Zoology 53, 92, 156 or equivalent and consent of instructor. (Combined course with Botany 203.) 4 s.h. ROBERTS

245. RADIATION BIOLOGY.—Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: College physics, mathematics and organic chemistry. 3 s.h., or 4 s.h. with laboratory. (w) FLUKE

246. MOLECULAR BIOLOGY.—The nature, functional relationships, and replication of biological structure at the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 s.h., or 4 s.h. with instructor's advance approval of laboratory work. (w) FLUKE

247. BIOLOGICAL NUCLEONICS.—Laboratory instruction in biological uses of radioactive tracers, in counting instruments and measurements, and in legal requirements. Prerequisites: By consent of instructor and normally two years of biology and one year of college chemistry. 2 s.h. (w) FLUKE

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. (Given at Beaufort only.) VERNBERG

252. COMPARATIVE PHYSIOLOGY.—The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 s.h. (w) K. SCHMIDT-NIELSEN

253. ADVANCED VERTEBRATE MORPHOLOGY.—Descriptive and experimental studies in comparative vertebrate morphogenesis. Prerequisites: Zoology 53, 92. 4 s.h. (w) HORN

271. CELLULAR PHYSIOLOGY.—The physiological processes of living matter approached through studies of cells. Prerequisites: Two years of biology and at least one year of chemistry. 4 s.h. (w) WILBUR AND MRS. SCHMIDT-NIELSEN

274. INVERTEBRATE ZOOLOGY.—A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Zoology 1, 2. 4 s.h. (w) BOOKHOUT

276. PROTOZOOLOGY.—The morphology, physiology, taxonomy, and culture of protozoa. Prerequisites: Zoology 1, 2. 4 s.h. (w) BOOKHOUT

278. INVERTEBRATE EMBRYOLOGY.—Lectures, readings and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 s.h. (w) BOOKHOUT

MARINE LABORATORY. The following courses are given at Duke University Marine Laboratory, Beaufort, N. C.: 203, Marine Ecology; 214, Biological Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology. Consult the announcement of the Duke University Marine Laboratory.

### DEPARTMENTAL MAJOR

*Prerequisites:* Zoology 1 and 2.

*Major Requirements* (for both A.B. and B.S. degrees): A minimum of 24 s.h. of zoology including at least one course in each of the following three areas: morphology (53, 92, 156, or 278), physiology (151 or 271), and genetics (71 or 110).

With the prior approval of the Director of Undergraduate Studies, up to 6 s.h. of advanced work in the natural and formal sciences, other than zoology, may be counted toward the 24 s.h. of the zoology major.

*Related Work:*

*A.B. Degree:* Related work will include at least one year of chemistry with additional work usually chosen from courses in botany, chemistry, geology, mathematics, or physics. The language requirement will preferably be met by French, German, or Russian.

*B.S. Degree:* Related work will include Chemistry 151 and 152 with additional work chosen from courses in botany, geology, mathematics or physics. Language requirements may be met by two languages, chosen from German, French, or Russian.

The Department offers work leading to graduation with distinction. See the section on Honors.

# College of Engineering

## CIVIL ENGINEERING

PROFESSOR BROWN, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSOR WILLIAMS; ASSOCIATE PROFESSORS BRYAN AND PALMER; ASSISTANT PROFESSORS ARGES, HAINES, HARRAWOOD, HILL, HOLLAND, AND WOOD; VISITING ASSOCIATE PROFESSOR KUMAR; MESSRS. CHEN, KAO, MOLINA, MOORE, SAXENA, SHEPPARD, AND RAJAN

CE 61. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land surveys; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg. 1 and Math 21. 5 s.h. (w) SHEPPARD

CE 72. MATERIALS LABORATORY I.—Blending of granular materials and determination of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. (w) STAFF

CE 101. MATERIALS LABORATORY II.—Testing of soils, concrete, and bituminous mixtures. Mechanical analyses, compaction, consolidation, triaxial, and stability tests, analysis of test results. Prerequisite: CE 72; concurrent: Engrg. 107. 1 s.h. (w) SHEPPARD

CE S110. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisite: trigonometry; engineering graphics desirable. 3 s.h. (w) ARGES

CE 113. ROUTE SURVEYING.—Simple, compound and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. (w) WILLIAMS

CE 116. TRANSPORTATION ENGINEERING.—Location, design, construction

and maintenance of highways and city streets; soil stabilization; traffic studies; economics of planning and design. Prerequisite: CE 113, 135. 3 s.h. (w) WILLIAMS

CE 118. MATERIALS OF ENGINEERING.—Behavior of materials under load; mechanical properties as criteria for failure; elementary metallurgy. Ferrous and non-ferrous metals and non-metalic materials. Prerequisites: Engrg. 107 and 109 2 s.h. (w) WILLIAMS

CE 121. *HYDROLOGY.—Fundamentals of meteorology; precipitation; evaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg. 128. 3 s.h. (w) WILLIAMS

CE 123. HYDRAULIC ENGINEERING.—Pipe flow, compound pipe systems, network analysis, analysis and problems on pumps and turbines, fundamental aspects of hydrology. Open channel flow, non-uniform flow computations. Irrigation and drainage problems. Flood control and hydraulic structures. Prerequisite: Engrg. 128. 3 s.h. (w) WILLIAMS

CE 124. FUNDAMENTALS OF SANITARY ENGINEERING.—Engineering and public health aspects of water treatment and supply waste treatment and disposal, and environmental sanitation. Design basis for collection and treatment facilities. Laboratory procedures and interpretation of results. Prerequisite: Chemistry 2; concurrent: CE 123. 3 s.h. (w) BRYAN

CE 126. *SANITARY ENGINEERING DESIGN.—Design of facilities for providing an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisite: CE 124. 3 s.h. (w) BRYAN

CE 131. STRUCTURAL MECHANICS I.—Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg. 107. 3 s.h. (w) BROWN

CE 132. STRUCTURAL DESIGN.—Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring connectors. Design and detail drawings. Prerequisite: CE 131. 4 s.h. (w) PALMER

CE 133. REINFORCED CONCRETE.—Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. (w) BROWN AND PALMER

CE 135. SOIL MECHANICS—Soil identification and classification; elementary soil physics; drainage; exploration; stability of footings and retaining walls; settlement; application of theory to foundation design. Prerequisite: Engrg. 107. 2 s.h. (w) STAFF

CE 140. STRUCTURAL MECHANICS II.—Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 121. 3 s.h. (w) HILL

CE 143, 144. *PROJECTS IN CIVIL ENGINEERING.—This course may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case it may be substituted for certain civil engineering courses. 3-6 s.h. (w) STAFF

CE 146. PROFESSIONAL ENGINEERING.—Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Senior only. 2 s.h. (w) PALMER

CE 148. *STRUCTURAL ENGINEERING.—Structural design utilizing metals, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisites: CE 132 and CE 133. 3 s.h. (w) PALMER

CE 154. *GEOMETRIC THOROUGHFARE DESIGN.—Analysis and design of municipal street systems. Origin-destination surveys; control of traffic flow; grade, rotary, and grade-separation intersections. Prerequisite: CE 113. 3 s.h. (w) WILLIAMS

* Offered only upon sufficient demand; enrollment limited.

CE 202. *ADVANCED MECHANICS OF MATERIALS AND EXPERIMENTAL STRESS ANALYSIS.—The analysis of stress and strain in deformable bodies, correlation of theory with data from experiment. Photoelasticity. Strain gages. Similitude. Prerequisite: permission of instructor. 3 units. (w) KUMAR

CE 203. ADVANCED MECHANICS OF MATERIALS.—Analysis of structural elements described by ordinary differential equations such as beams on an elastic foundation, circular plates; applications to elementary problems of plates and shells. Introduction to elasticity and plasticity. Energy methods in elasticity. 3 units. HILL

CE 204. THEORY OF PLATES AND SHELLS.—Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 205. THEORY OF ELASTICITY.—Linear theory of elasticity; solutions of two dimensional problems; three dimensional problems of torsion and bending; elastic wave propagation; energy principles. Prerequisite: CE 203 or equivalent. 3 units. HILL

CE 211. BEHAVIOR OF MATERIALS.—Macroscopic mechanical properties of materials for static, fatigue, dynamic, and creep conditions; low and high temperature properties; applications. 3 units. KUMAR

CE 231. STRUCTURAL THEORY AND ANALYSIS.—The application of the fundamental theories of structural action to the design and analysis of structural members. Specifications. Planning of CE projects. 3 units. BROWN

CE 232. REINFORCED CONCRETE THEORY.—Design and analysis of reinforced concrete members including plates and shells. Prestressed and poststressed concrete members. 3 units. BROWN

CE 235. FOUNDATION ENGINEERING.—The theory and application of soil mechanics to the design and analysis of foundations, subsurface structures, and earth works. 3 units. STAFF

CE 242. *HYDRAULIC ENGINEERING.—Fundamental principles of flow, effects of gravity, viscosity, compressibility, and surface tension of fluid motion in closed conduits and open channels; surface and form resistance; hydraulic similitude. Fundamentals of applied hydrology. 3 units. WILLIAMS AND WOOD

CE 244. *SANITARY ENGINEERING PROCESSES.—Fundamental bases for design of water and waste treatment systems, including: transport, mixing, sedimentation and filtration; gas transfer, coagulation, and bio-treatment processes. 3 units. BRYAN

CE 250. ENGINEERING ANALYSIS.—General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical techniques; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and non-uniform properties and with rigid and non-rigid supports. 3 units. WOOD

The Department offers work leading to graduation with distinction. See the section on Honors.

## ELECTRICAL ENGINEERING

PROFESSOR WILSON, CHAIRMAN; PROFESSOR MEIER, DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS SEELEY AND VAIL; ASSOCIATE PROFESSORS ARTLEY, KOEPSEL, KRAYBILL, AND OWEN; ADJUNCT ASSOCIATE PROFESSOR BURGER; ASSISTANT PROFESSORS GEORGE, MCKEEL, AND PILKINGTON; INSTRUCTORS JONES AND HAMMOND; LECTURER OLIVE; MESSRS. CHAMBERS, FENG, HALL, HUNT, JACKSON, LEFLOCH, OWSLEY, PALMER, AND YU

EE 53. ELECTRICAL ENGINEERING FUNDAMENTALS.—Survey of electrical engineering profession: role of engineering and professional engineering soci-

* Offered only upon sufficient demand; enrollment limited.

eties in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction to staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h. (w) KRAYBILL AND MEIER

EE 55. ELECTRIC NETWORKS I.—Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Prerequisite: Physics 42. Concurrent: Mathematics 63. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 56. ELECTRIC NETWORKS II.—Network impedance and admittance functions; stead-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Mathematics 64. Three class sessions and one two-hour computation. 4 s.h. HAMMOND, PALMER, AND VAIL

EE 109-110. ELECTROMAGNETIC SYSTEMS.—Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic material. Prerequisite: EE 56. Concurrent: Mathematics 111. Three class sessions and one two-hour computation. 8 s.h. (w) ARTLEY AND JACKSON

EE 111-112. ELECTRICAL PRINCIPLES LABORATORY.—Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite: EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. (w)
JACKSON, LEFLOCH, AND PALMER

EE 123. FUNDAMENTALS OF ELECTRICAL ENGINEERING.—Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering; principles of electric circuits, fields, and electronics. Prerequisites: Mathematics 63 and Physics 42. Concurrent: EE 125. Three class sessions. 3 s.h. (w) HAMMOND AND HUNT

EE 124. INDUSTRIAL ELECTRICAL ENGINEERING.—Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering: alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. (w)
HUNT

EE 125. ELECTRICAL FUNDAMENTALS LABORATORY.—Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) HAMMOND, HUNT, OWSLEY, AND PALMER

EE 126. INDUSTRIAL ELECTRICAL LABORATORY.—Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) HALL AND OWSLEY

EE 127. *ELECTRONICS FOR ENGINEERS.—Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering: amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. (w) STAFF

EE 159. *TRANSMISSION.—Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110; Mathematics 111. Elective for electrical majors. 3 s.h. (w) SEELEY

* Offered only upon sufficient demand; enrollment limited.

EE 165-166. ELECTRICAL ENGINEERING SEMINAR.—A course which provides an opportunity to consider matters related to the professional practice of electrical engineering; to relate the undergraduate program of studies to current practice; and to improve the ability to communicate more effectively, both in verbal and written form, particularly with regard to technical material. One class session. 2 s.h. (w) STAFF

EE 173-174. *PROJECTS IN ELECTRICAL ENGINEERING.—A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of the Chairman of the Department must be obtained before registering. Elective for electrical majors. 3-6 s.h. (w) STAFF

EE 177. *ENERGY TRANSMISSION AND RADIATION.—A more advanced treatment of electromagnetic theory than is afforded by EE 109-110, with particular application to wave guides and antennas. Prerequisite: EE 110 and permission of instructor. Three class sessions. 3 s.h. (w) ARTLEY

EE 179. *ADVANCED ELECTRICAL MEASUREMENTS.—Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. (w) OWEN

EE 181-182. ELECTRONIC NETWORKS.—Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; microwave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. (w) OWEN AND PILKINGTON

EE 183-184. ELECTRONICS LABORATORY.—Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. (w) CHAMBERS, FENG, AND OWEN

EE 191-192. ELECTRIC MACHINERY.—Application of circuit and field principles to underlying theory of static and rotating electrical machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. (w) MEIER AND WILSON

EE 193-194. ENERGY CONVERSION LABORATORY.—Selected experiments in energy conversion combining the theory and practice of transformers, electromechanical devices including motors and generators, photovoltaic sources, thermoelectric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 192-193. 2 s.h. (w) HALL, WILSON, AND YU

EE 199. *LINEAR FEEDBACK SYSTEMS.—Analysis and design of linear; continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: Permission of instructor. 3 s.h. JONES AND KOEPSEL

EE 201. ENERGY SYSTEMS.—Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units. (w) ARTLEY

EE 203, 204. INFORMATION SYSTEMS.—General concepts of information storage, transfer, and processing: information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: Permission of instructor. 6 units. (w) OWEN

* Offered only upon sufficient demand; enrollment limited.

EE 207. *NETWORK SYNTHESIS.—Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: Permission of instructor. 3 units. KOEPSEL, OWEN, AND VAIL

EE 211. SOLID STATE THEORY.—The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. (w) ARTLEY, BURGER, PILKINGTON, AND VAIL

EE 212. SOLID STATE MATERIALS.—Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units. (w) ARTLEY, BURGER, PILKINGTON, AND VAIL

EE 213. MAGNETICS.—A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units. (w) ARTLEY AND WILSON

EE 215, 216. SOLID-STATE DEVICES.—Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: Permission of instructor. 6 units. (w) BURGER AND PILKINGTON

EE 221. NONLINEAR ELECTROMAGNETICS.—Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. (w) WILSON

EE 222. NONLINEAR ANALYSIS.—Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. (w) WILSON

EE 231. *NUCLEAR ENGINEERING.—Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: Permission of instructor. 3 units. (w) MEIER

EE 241. *FEEDBACK CONTROL SYSTEMS.—Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; nonstationary and nonlinear systems. Prerequisite: Permission of instructor. 3 units. KOEPSEL AND WILSON

EE 242. *OPTIMUM CONTROL SYSTEMS.—Use of variational methods in control system design: classical calculus of variations; dynamic programming; Pontriagin's maximum principle; quadratic and nonquadratic performance criteria; adaptive control systems; computer application in control. Prerequisite: Permission of instructor. 3 units. KOEPSEL

* Offered only upon sufficient demand; enrollment limited.

EE 243. *NONLINEAR CONTROL SYSTEMS.—Analysis and design of nonlinear feedback control systems; approximations for small and for large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. KOEPSEL AND WILSON

EE 259. *ADVANCED ELECTRIC ENERGY CONVERSION.—Equations of motion of electromechanical systems, fields and lumped parameters, state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: Permission of instructor. 3 units (w) MEIER AND WILSON

The Department offers work leading to graduation with distinction. See the section on Honors.

## MECHANICAL ENGINEERING

PROFESSOR MACDUFF, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES; PROFESSORS KENYON AND MERIAM; ASSOCIATE PROFESSORS BOYLE AND ELSEVIER; ASSISTANT PROFESSORS BUZZARD, HARMAN, LEWIS, AND NASH; VISITING PROFESSOR CHURCH; VISITING LECTURER MIXON; MESSRS. ALEXANDER, BENGEL, BRESEE, BUROW, KENDRICK, AND TITUS

ME 52. KINEMATICS, KINETICS.—Analytical and numerical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for automatic machines, application of work, energy, impulse and momentum. Prerequisite: Engrg 2, Phys 41. Concurrent: Math 63. 3 s.h. (w) MACDUFF

ME 59. MATERIALS AND PROCESSES.—Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: Sophomore standing. 3 s.h. (w) STAFF

ME 101-102. ENGINEERING THERMODYNAMICS.—A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisite: Chem 1, Phys 42. Concurrent: Math 64. 6 s.h. (w) KENYON

ME 103. THERMODYNAMICS.—A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapor; elements of combustion and heat transfer. Prerequisite: Chem 1, Phys 42. Concurrent: Math 64. 3 s.h. (w) MIXON

ME 105. DYNAMICS OF FLUIDS.—A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41, Math 63. 3 h.h. (w) KENYON

ME 106. HEAT TRANSFER.—A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 102, 105; Math 111. 3 s.h. (w) KENYON

ME 114. JUNIOR MECHANICAL ENGINEERING LABORATORY.—Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 101-102, ME 105, 106. 2 s.h. (w) STAFF

ME 116. MECHANICAL ENGINEERING LABORATORY.—Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamic properties of systems. Student planning of ex-

* Offered only upon sufficient demand; enrollment limited.

periments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. (w) STAFF

ME 128. *DYNAMICS OF GASES.—The flow of compressible fluids at high velocities. One-dimensional compressible flow; area change; normal shock; friction and heat transfer; Mach number. Prerequisite: ME 102. Concurrent: ME 106. 3 s.h. (w) STAFF

ME 141. MACHINE DESIGN.—Methods of design of typical machine elements; strength and deflection requirements; simple shafts, springs, power transmitting devices, materials, and cost analysis. Prerequisite: Engrg. 107, ME 59. Concurrent: ME 52. 3 s.h. (w) NASH

ME 142. MACHINE DESIGN.—A continuation of ME 141. Analysis of gears and gear trains; lubrication; brakes and clutches; introduction to advanced topics. Prerequisite: ME 141. 3 s.h. (w) NASH

ME 153. *HEATING, AIR CONDITIONING, AND REFRIGERATION.—Principles of thermodynamics, heat transfer, and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression, absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. (w) HARMAN

ME 156. COMBUSTION ENGINES.—A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern developments. Prerequisite: ME 102. 3 s.h. (w) HARMAN

ME 157. *PUMPS, COMPRESSORS AND TURBINES.—An introduction to the theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h. (w) BOYLE

ME 159-160. SENIOR MECHANICAL ENGINEERING LABORATORY.—Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. (w) STAFF

ME 162. POWER PLANTS.—Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. (w) HARMAN

ME 163. *VIBRATION CONTROL.—An introduction to the dynamics of mechanical systems; equilibrium, stability lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog stimulation. Prerequisite: Math 64. ME 141. 3 s.h. (w) CHURCH

ME 164. *ENGINEERING ANALYSIS.—A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretation of results. Concurrent: Math 64. 3 s.h. (w) BOYLE

ME 166. *AIR CONDITIONING DESIGN.—Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. (w) HARMAN

ME 167. INDUSTRIAL ENGINEERING.—A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: Senior standing. 3 s.h. (w) LEWIS

ME 168. *INDUSTRIAL ENGINEERING PRODUCTION METHODS.—Study

* Offered only upon sufficient demand; enrollment limited.

of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: Senior standing, ME 167 or equivalent. 3 s.h. (w) LEWIS

ME 171. RESPONSE OF PHYSICAL SYSTEMS.—An introduction to the basic fundamentals of instrumentation and of the control of processes and systems with emphasis on correlation of analysis and experimental results. Prerequisite: Math 111. 3 s.h. (w) CHURCH AND MACDUFF

ME 173-174. MECHANICAL ENGINEERING SEMINAR.—A course designed to keep the students abreast of progress in the engineering field and to develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. (w) STAFF

ME 182. *FUNDAMENTALS OF NUCLEAR ENGINEERING.—Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope, utilizations, reactor systems and power reactors. Prerequisite: Permission of instructor. 3 s.h. (w) KENYON

ME 197-198. PROJECTS IN MECHANICAL ENGINEERING.—This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. (w) STAFF

ME 201. *THEORETICAL AND APPLIED MECHANICS.—Introduction to the theory of elasticity, vibration analysis, and hydrodynamics. This course is the same as CE 201. 3 units. CHURCH

ME 202. *THEORETICAL THERMODYNAMICS.—Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. HARMAN

ME 221. *ANALYSIS OF INCOMPRESSIBLE AND COMPRESSIBLE FLUID FLOW.—Flow of incompressible and compressible fluids; boundary layer phenomena for viscous fluids; Mach number concept for sonic and subsonic flow; experimental methods. 3 units. HARMAN

ME 222. *ANALYSIS OF HEAT TRANSFER.—Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units. KENYON

ME 231-232. *SYSTEMS ENGINEERING.—Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. CHURCH AND MACDUFF

ME 280. *NUCLEAR REACTOR POWER CYCLES.—Introduction to basic reactor principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units. KENYON

The Department offers work leading to graduation with distinction. See the section on Honors.

## ENGINEERING SUBJECTS COMMON TO ALL CURRICULA

ENGRG 1. ENGINEERING GRAPHICS.—The study of elementary engineering graphics with emphasis on third angle projection, pictorial drawing, dimensioning, working drawings, pencil and ink techniques. 2 s.h. (w) HAINES, LEWIS, AND STAFF

ENGRG 2. DESCRIPTIVE GEOMETRY.—A study of drawing board geometry with emphasis on line and plane problems, developments, and intersections. Further emphasis on drawing techniques. Prerequisite: Engrg 1. 2 s.h. (w) HAINES, LEWIS, AND STAFF

* Offered only upon sufficient demand; enrollment limited.

ENGRG 57. STATICS.—A study of force systems equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisites: Engrg 1 and Phys 41; concurrent: Math 63. 3 s.h. (w) ARGES, WILLIAMS, AND WOOD

ENGRG 60. ENGINEERING MECHANICS.—A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using vector and scalar values. Concurrent: Phys. 42 and Math 63. 4 s.h. HARRAWOOD AND HILL

ENGRG 107. MECHANICS OF MATERIALS.—Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area—moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60; concurrent: Math 64. 3 s.h. (w) ARGES, PALMER, AND SHEPPARD

ENGRG 109. MECHANICS OF MATERIALS LABORATORY.—Study and use of testing machines and strain gages; tests to determine significant physical properties of the common engineering materials; experimental verification of the elementary theory of structural members. Must be preceded or accompanied by Engrg 107. 1 s.h. (w) ARGES AND SHEPPARD

ENGRG 115. DYNAMICS.—General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum, gyroscopic motion. Prerequisite: Engrg 57; concurrent: Math 64. 3 s.h. (w) HILL

ENGRG 128. FLUID MECHANICS.—Physical properties of fluids, fluid statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic similarity, fluid flow in closed conduits and in open channels, fluid measurements. Prerequisites: Engrg 60. Engrg 115 or ME 52, Math 64. 3 s.h. (w) HARRAWOOD, WILLIAMS, AND WOOD

ENGRG 153. *ARCHITECTURAL ENGINEERING.—The application of engineering principles to architecture; the influence of engineering function and trends on design; the interrelationship of engineering with architecture; the analysis of structural details and of processes of construction; field trips and inspection of construction projects. Prerequisite: Permission of instructor. 3 s.h. (w) HAINES

ENGRG 169. *LEGAL ASPECTS OF ENGINEERING.—A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real and personal property, torts, insurance, agency, equity, evidence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h. (w) OLIVE

ENGRG 170. *PATENT LAW FOR ENGINEERS.—A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h. (w) OLIVE

# THE DIVINITY SCHOOL

Fall semester begins September 24, 1964

Spring semester begins February 4, 1965

# General Information

## HISTORICAL STATEMENT

THE Indenture of Trust signed on December 11, 1924, by Mr. James B. Duke, which established Duke University, mentioned first among its objects the training of ministers of the Gospel. The Divinity School was, accordingly, the first of the graduate professional schools to be organized. Its work began with the year 1926-1927, the formal opening exercises being held on November 9, 1926.

The Reverend Doctor Edmund Davison Soper was the first Dean of the Divinity School. He resigned in 1928 to become President of Ohio Wesleyan University, and was succeeded by the Reverend Doctor Elbert Russell, and the latter in turn in 1941 by the Reverend Doctor Paul Neff Garber. In 1944, Dean Garber was elected to the episcopacy of the Methodist Church, and Doctor Harvie Branscomb assumed the duties of the Dean's office. In 1946, Dean Branscomb became Chancellor of Vanderbilt University, and in 1947 the Reverend Doctor Paul E. Root was elected Dean but died before he could assume the office. The Reverend Doctor Harold A. Bosley became Dean in 1947 and resigned in 1950 to become the pastor of the First Methodist Church, Evanston, Ill. The Reverend Doctor James Cannon was appointed Dean of the Divinity School March 1, 1951. After a period marked by important administrative integration of the School, Doctor Cannon resigned the duties of deanship, September 30, 1958. The Reverend Professor Robert Earl Cushman was elected Dean and assumed the responsibilities of the office October 1, 1958.

## THE PURPOSE OF THE DIVINITY SCHOOL

The primary purpose of the Divinity School is to provide training for properly qualified persons planning to enter the Christian ministry. This includes not only prospective ministers in local churches, but also those preparing themselves to be missionaries at home and abroad, ministers of Christian Education, teachers of religion, and chaplains. Vital to all of these forms of service is a full understanding of the beginnings, content, and history of the Christian faith and its special pertinence for the spiritual needs of the modern world. Studies of a broad and thorough character directed toward such an understanding constitute the center of the curriculum of the Divinity School and are regarded as the basic training for all prospective Christian ministers. Specific instruction in the skills required of local ministers

and of leaders in the work of Christian Education is also provided. As funds become available for the purpose and as needs appear, additional training in specialized skills and areas of knowledge will be added to the curriculum.

Bound by ties of history and obligation to The Methodist Church, the Divinity School is ecumenical in its interests and outlook. Its faculty is limited to no one denomination, but draws upon the resources of them all. Students of the several denominations are admitted on an equal basis. The Divinity School conceives its task to be one of broad service to the Church in all of its forms.

## THE RELATION OF THE DIVINITY SCHOOL TO DUKE UNIVERSITY

The Divinity School is an integral part of the University and shares fully in its activities, privileges, and responsibilities. The Sunday services in the University Chapel give Divinity School students an opportunity to hear each year a number of leading ministers of the country. The University Libraries make easily accessible a rich collection of 1,650,000 volumes. Selected courses in the Graduate School of Arts and Sciences and in the professional schools are open to Divinity School students without payment of additional fees. The general cultural and recreational resources of the University are available to them on the same basis as to other students.

## COURSES OF STUDY OFFERED BY THE DIVINITY SCHOOL

The Divinity School offers three courses of study. The basic course is that which leads to the degree of Bachelor of Divinity. This is a three-year course and is recommended to all those preparing themselves for the work of the parish ministry. Students who hold pastoral charges, or other remunerative work requiring any substantial time apart from their studies, may carry only reduced schedules of work, and, in most cases, unless work is taken in the Duke University Summer Session, will spend four years in completion of the requirements for the B.D. degree.

The Divinity School offers study leading to the degree of Master of Religious Education. This course is designed for persons who wish to take specialized positions in the work of Christian Education. The course does not provide a general preparation for the work of the regular ministry and cannot serve as a substitute for it. No exchange of credits between the two courses is permitted, nor can departmental courses taken be credited toward more than one degree.

A new program of study leading to the degree of Master of Theology (Th.M.) was instituted in the academic year 1960-1961. This course is planned to afford a limited number of superior students an

opportunity for intensive theological study beyond the B.D. degree. It is a terminal professional degree, ordinarily to be completed in a year, and not to be regarded as leading toward a doctorate.

## COURSES OF STUDY IN RELIGION OFFERED BY THE GRADUATE SCHOOL OF ARTS AND SCIENCES

Students who desire to pursue studies in religion leading to the degrees of Master of Arts or Doctor of Philosophy in Religion should register in the Graduate School of Arts and Sciences. Study and research may be pursued in three fields: (1) Biblical Studies; (2) Historical Studies, and (3) Systematic and Contemporary Studies. A list of courses approved by the Graduate Faculty for work in these fields, together with general requirements for admission to the Graduate School, may be found in the *Bulletin of the Graduate School.* This Bulletin is available on application to the Dean of the Graduate School of Arts and Sciences, Duke University.

A limited number of University Scholarships and Fellowships, among which are three Gurney Harriss Kearns Fellowships, ranging from $2,000-$3,000, as well as Rockefeller Doctoral Fellowships in Religion, Woodrow Wilson Fellowships and Kent Fellowships. Applications for these must be submitted to the Dean of the Graduate School on University forms not later than February 15 of each year.

Inquiries concerning specific requirements of the Program of Religion in the Graduate School should be addressed to Professor Waldo Beach, Director of Graduate Studies in Religion.

## LIBRARY RESOURCES

The Divinity School Library, containing a collection of more than 114,000 volumes in the field of religion and closely related disciplines, affords an unusual wealth of material for the seminary student. Although it is an integral part of the University's nine-unit library system which possesses more than 1,650,000 books, the Divinity School Library has its own separate facilities in the Divinity School building. Its book collection is operated on the open stack system; and its reading room provides study facilities for students and housing space for the special reference collection in religion and for the current numbers of the more than 350 religious periodicals to which the Library subscribes.

Staffed by a Librarian and a Reference Librarian who are trained in theology as well as in library administration, and by an experienced Circulation Librarian who is aided by a full-time assistant and a number of student assistants, the Divinity School Library offers a variety of reference services to assist the student in selecting and locating materials. The staff, in cooperation with the faculty, main-

tains a book and periodical collection to support both basic courses and advanced research in all major fields of religious studies.

The Divinity School Library is adjacent to the General Library and is internally connected with it by a corridor which gives easy access to its many departments. The seminary student is permitted to withdraw books from the collection of more than 1,000,000 volumes in the General Library, and to make use of its other resources and facilities which include manuscripts, archives, public documents, newspapers, periodicals, microfilm, maps, rare materials (among which are twenty-six prized ancient Greek manuscripts), reference assistance, and provision for the borrowing of books not in the Duke Libraries from the Library of the University of North Carolina and other institutions.

## THE HENRY HARRISON JORDAN LOAN LIBRARY

Henry Harrison Jordan, distinguished member of the Western North Carolina Conference (1862-1931) was memorialized by his children in the establishment of an endowment in 1947. The Divinity School Librarian is the custodian of books purchased under this fund for loan, through postal services, to qualified ministers of all denominations or localities. The Jordan Loan Library undertakes to maintain a catalogue of up-to-date publications representative of the several theological disciplines and areas of the minister's professional interest. Books are loaned on application to the Librarian of the Divinity School from a printed catalogue supplied on request.

## ORMOND MEMORIAL FUND

Established 1924 by Dr. J. M. Ormond, '02, and Mrs. Ormond, in memory of his mother and father, Mr. and Mrs. J. J. Ormond; the income to be used for the purchase of a collection of books on the rural church for the Library of the Divinity School at Duke University.

## AVERA BIBLE FUND

Established 1895 by gift of Mrs. L. B. McCullers in memory of her husband, Willis H. Avera; the income to be used for the purchase of books for the Divinity School Library.

## LOUIS W. BAILEY MEMORIAL FUND

This memorial fund was established in 1958 by the Reverend A. Purnell Bailey in memory of his father. The income is to be used for books for the Divinity School Library.

## THE WILLIAM ARTHUR KALE, JR., MEMORIAL FUND

William Arthur Kale, Jr. was a member of the Duke University class of 1958, a lover of sacred art and music, and a member of the University Chapel Choir. In his memory there was established in 1964, by the provision of his parents, Professor and Mrs. William Arthur Kale, Sr., a fund for the purchase of books and other materials in the area of fine arts and religious musicology for the perpetual enrichment of the holdings of the Divinity School Library.

## CORPORATE WORSHIP

One of the most important aspects of a program of training for Christian service is warm and discriminating common prayer. The center of the corporate life of the Divinity School is its own place of worship, York Chapel. Regular chapel services are held, at which all students are expected to be present. Services are led by members of the faculty, by visiting ministers, and by members of the student body. Prayer groups are held in the dormitories weekly and special groups during the Lenten Season.

## PUBLIC LECTURES

The Committee on Lectures and Public Events presented the following lecturers (with their topics) during the year 1963-64: Dr. Lester A. Welliver, the Judicial Council of the Methodist Church ("The Work of the Judicial Council"); Professor Charles Stinnette, the Divinity School of the University of Chicago ("The Pastoral Ministry in Theological Perspective"); Professor Ragnar Bring, the University of Lund, Sweden ("Conditions for Preaching in an Atheistic Age"); Professor Darrell Randall, Chairman of the Africa Area Studies Program, American University ("What is the Matter with the new Nations"); President Douglas Knight, Duke University, "The Poet as Prophet: Art and Religious Insight." The third Faculty Lecture was delivered by Dr. William F. Stinespring ("Temple Research in Jerusalem"). In "Reflections on Vatican II, the Second Session," Dean Robert E. Cushman offered a lecture on the Vatican Council, February 5, 1964.

## THE JAMES A. GRAY LECTURESHIP

The James A. Gray Lectures were established in 1950 as part of the fund set up in 1947 by Mr. James A. Gray of Winston-Salem, North Carolina. This lectureship was once again delivered in connection with the Ministers' Convocation, held at the University in the fall. The lecturer in 1963-64 was the Reverend Professor Joseph Sittler, the Divinity School of the University of Chicago. His subject was "Reflections on Nature and Grace." Father Godfrey Diekmann of St. John's Abbey, Collegeville, Minnesota, will deliver the 1964-65 lectures October 26-28, 1964.

### THE DIVINITY SCHOOL LIBRARY LECTURESHIP

In 1948 the Duke Divinity School Library Lectures were established by the Reverend George Brinkmann Ehlhardt for the purpose of bringing to the Divinity School a succession of religious leaders. The lecturer for 1963-64 was the Reverend Dr. G. Henton Davies, Principal of Regent's Park College, Oxford, England. His subject was "Amos and Jerusalem."

# Program of Continuing Education



### DIVINITY SCHOOL SEMINARS

THE Divinity School, with the support of the James A. Gray Fund, conducts each year a series of extension seminars consisting of two-day study courses for Divinity School alumni and other ministers. In 1963-64 three Seminars were held as follows: Columbia, S. C., in Main Street Methodist Church (November 11-12, 1963); Charlotte, N. C., in First Methodist Church (January 20-21, 1964); and Raleigh, N. C., in Edenton Street Methodist Church (January 23-24, 1964). The subject presented in all three Seminars was "The Meaning of Salvation."

Lecturers were Dr. Thor Hall, Assistant Professor of Preaching and Theology in the Divinity School of Duke University; Dr. John David Maguire, Assistant Professor of Religion in Wesleyan University (Connecticut); Dr. William Barr Oglesby, Jr., the Marthina DeFriece Professor of Pastoral Counseling in Union Theological Seminary in Virginia; and Dr. Charles Roy Stinnette, Jr., Professor of Pastoral Theology in the Divinity School of the University of Chicago.

Projected for 1964-65 are Seminars in Columbia, S. C., at Washington Street Methodist Church (November 9-10, 1964); Greensboro, N. C., at West Market Street Methodist Church (January 18-19, 1965); and Fayetteville, N. C., at Hay Street Methodist Church (January 21-22, 1965). The subject will be: "Current Interpretation of the New Testament."

Lecturers will be Dr. Hugh Anderson, Professor of Biblical Criticism and Theology in the Divinity School of Duke University; Dr. Howard Clark Kee, Professor of New Testament in Drew University; and Dr. Krister Stendahl, the Frothingham Professor of Biblical Studies in the Divinity School of Harvard University.

## THE CLINIC IN PREACHING

The Clinic in Preaching will again be offered in the summer of 1964, July 20-July 31, under the direction of Dr. Thor Hall, for 18 ministers who are active in the pastoral ministry. No academic credit will be given.

## THE CLINIC IN PASTORAL CARE

The Clinic in Pastoral Care is offered under the direction of Professors Richard A. Goodling and Robert E. Smith and assisted by the Chaplains in the Medical Center and will be held July 20-July 31, 1964. Through lectures, group discussions, and hospital visitation experiences, explorations are made of the meaning of selfhood, the self in crisis, and the ministry to those caught in the crisis of illness. Registration is limited to twenty ministers of any denomination who hold the B.D. degree. No academic credit will be given.

## THE RURAL CHURCH CLINIC

A Rural Church Clinic will be held July 20-July 31, 1964, under the direction of Professor M. Wilson Nesbitt. Twenty to twenty-five participants will engage in two weeks of intensive training, study, and planning in some phase of the "Church's Program in the Rural Community."

Registration is open to all persons interested in the program of the rural church. No academic credit will be given.

## THE SCHOOL FOR SUPPLY PASTORS

In cooperation with the Department of In-Service Training of the Board of Education and the Southeastern Jurisdictional Conference of The Methodist Church, Professor W. A. Kale directs for the Divinity School a School for Supply Pastors of The Methodist Church and others taking the Methodist course of study for ministers. This school is in session for approximately four weeks each summer, and the required studies for one full year can be completed in this period. This is not a part of the regular work of the Divinity School and no credit toward a seminary degree can be earned. The faculty includes representatives from the Divinity School and other church-related institutions plus selected leaders of nearby Annual Conferences. The sixteenth session of the Supply Pastors' School is scheduled for July 13-August 7, 1964.

## FACILITIES FOR ADVANCED STUDY IN THE AMERICAN SCHOOLS OF ORIENTAL RESEARCH

The Divinity School of Duke University is one of the supporting members of the American Schools of Oriental Research. Accordingly, students in the Divinity School have the privilege of attending the

American School in Jerusalem or the one in Bagdad without charge for tuition. They may also compete for the financial aids which are offered annually by the Schools. These consist of four fellowships, the stipends depending upon available funds.

# Student Life



## DIVINITY SCHOOL CHOIR

A STUDENT organization of long standing is the Divinity School Choir. Membership in the Choir is open to all qualified students. The Choir sings regularly for the daily services in York Chapel and at special seasonal programs and services. New members are chosen by informal auditions held during the first week of fall classes. Auditions are arranged for all who are interested.

## THE COORDINATING COUNCIL FOR COMMUNITY LIFE

Beginning with the 1964-65 academic year the Student Government Association is superceded by a Coordinating Council for Community Life. This Council is composed of representatives from the student body, faculty, administration, Divinity Dames, and the doctoral students in religion.

The purpose of the Council is, as the name implies, to coordinate the activities of the Divinity School community. Realizing that there are many shared interests and concerns within the community which cannot be expressed fully in a student body organization alone, the Council was created by a joint student-faculty committee and approved by participating groups.

The shared interests and activities of the community are expressed through the several committees of the Council. The Council has coordinating, reviewing, and initiating powers in matters affecting the common life.

Student members of the Council are elected by the three B.D. classes, the M.R.E. candidates, the Th.M. candidates and the student pastors. A student activity fee is collected at the beginning of each academic year to support the activities of the community. The fee, in recent years, has been six dollars ($6.00). The funds are administered through committees and are spent on such projects as missions, social action, social events, and student publications.

## DIVINITY DAMES

The wives of Divinity School students have an organization through which there is opportunity for informal fellowship during the period of the students' residency. For the past several years lecture courses, running for two-week periods in the fall and spring semesters, have provided instruction in various aspects of parish life and in theological and Biblical subjects and issues. The dean and faculty are concerned to assist the wife to understand her husband's vocation and to participate appropriately.

## STUDENT PUBLICATIONS

In cooperation with the Dean's Office, students publish a faculty and student *Directory*. Under their editorship is published a monthly paper entitled *Response*.

# Admission and Requirements for Degrees

## *Requirements for Admission*

THE Divinity School is a fully accredited member of the American Association of Theological Schools, and is one of twelve accredited seminaries of The Methodist Church. Candidates for admission must hold the degree of A.B., or its equivalent, based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and their college records must be such as to indicate their ability to carry on graduate professional studies. They will be admitted without examination on presentation of an official, satisfactory transcript of college and all other academic credits which they may have secured. Recommendations from five responsible persons are required. Women will be admitted on the same basis as men.

Applications are evaluated with a view both to the academic achievement of the candidate and with reference to his personal and professional qualifications for the Christian ministry. While an academic average of less than "B—" is ordinarily regarded as a disqualification for admission, nevertheless, the Committee on Admissions is impressed with a rising curve of achievement in the undergraduate program and makes its decision on the basis of the whole body of credentials of an applicant, including supporting letters of reference.

The applications of students from foreign countries will be considered, each on its own merits, the general principle being that training equivalent to that of a baccalaureate degree from an accredited American college must have been secured.

In addition to an adequate academic preparation, applicants must satisfy the Faculty as to their Christian character and purpose. A formal application blank may be secured from the office of the Divinity School. This must be filled out and returned by all candidates for admission. Applications received after May 1 cannot be assured of admission, financial aid or dormitory rooms for the ensuing academic year. *A minimum of thirty days is required to process any application, in many cases longer.*

All persons admitted to the Divinity School are required to report

to the Student Health Service, Duke Hospital, for physical examination on days and at hours specified at the time of matriculation. No admission is final until approved by the Student Health Service, which requires a certificate of immunization and general health to be submitted not earlier than July 1 and not later than August 1. Applicants are also required to take certain tests administered by the Bureau of Testing and Guidance and by the Theological School.

Persons who do not matriculate at the time for which they were originally admitted forfeit admission and must be formally readmitted. A student who withdraws from the Divinity School and desires to return at a later date must file with the Dean a written request for a leave of absence.

Applicants are required on notification of admission to signify their acceptance within three weeks, and to pay an admission fee of $30.00. (Make check payable to Duke University and send to the Office of the Dean of the Divinity School.) This fee is applied to the regular first-term bill if the student matriculates; if he fails to do so, the fee is forfeited. This does not apply to the Summer Session.

Under the terms of the Selective Service Act, as it now stands, pre-enrollment for later formal admission may be granted to persons who meet the Divinity School standards and requirements for admission. Applications for pre-enrollment may be addressed to the Office of the Dean. Pre-enrolled students must send transcripts of each year's college work by June 15th of each year in which they are pre-enrolled. *Pre-enrollment does not guarantee final admission,* and a person who has been pre-enrolled for any length of time must send a transcript of work by February 1 of the year in which admission is sought. This must be accompanied by a letter from the college dean or other approved reference certifying to continued academic acceptability, good character and conduct.

## PRE-SEMINARY CURRICULUM

The Divinity School, in substantial agreement with the standards of the American Association of Theological Schools, recommends that prospective candidates for admission keep in mind the desirability of including the following in their undergraduate curriculum:

It is suggested that a student should acquire a total of 90 semester hours or complete approximately three-fourths of his college work in the areas listed below. No work done towards a first college degree may be used toward a Divinity School degree.

| *Basal Fields* | *Semesters* (At least the number indicated) |
|---|---|
| English<br>Literature, composition and speech, and related studies | 6 |
| History, ancient, modern European, and American | 3 |
| Philosophy, orientation in history, content and method | 3 |
| Religion | 3 |

| | |
|---|---|
| Psychology | 1 |
| A foreign language | 4 |
| Greek, Latin, Hebrew, French and German are especially recommended. | |
| Natural Science | 2 |
| Fundamentals of Speech | 1 |

## TRANSFER OF CREDIT

Transfer of credit from theological schools accredited by the American Association of Theological Schools is provided for by the Faculty of the Divinity School under certain conditions. Applications for transfer of credit will be ruled upon by the Committee on Admissions, and will be subject to evaluation in terms of the prevailing requirements of the Divinity School for graduation. *Ordinarily, credit from another institution will not be granted in amount exceeding one-half of the total credits required by the Divinity School for graduation.* A student applying for transfer of credit in excess of this amount may be required to pass such examinations as the Committee on Admissions may prescribe. In each case a letter of honorable dismissal from the school from which transfer is made is required along with transcript of academic credits.

## ADVANCED STANDING

Advanced standing allows entering students to begin work in any given field at a level higher than that of the core curriculum, or to substitute a specialized or cognate course for a core requirement.

Entering students with substantial undergraduate preparation in areas closely related to required courses of the Divinity School core curriculum may be eligible for advanced standing. While a student may be eligible for advanced standing in any subject, it is especially pertinent where students offer undergraduate majors of superior quality in Bible, religion, or philosophy. Students entering with six or more semester hours in the Greek language should consult the catalogue under "Language Study" for a description of special privileges pertaining to their case. The fields in which entering students, by virtue of previous undergraduate study, are most likely to qualify for advanced standing are: Old Testament, New Testament, Types of Religious Philosophy, Church History.

An entering student who offers not less than *six* semester hours of college credit, with a grade of "B" or better in one or more of these areas may ordinarily anticipate advanced standing in corresponding required courses of the Divinity School core curriculum. All final transcripts will be studied, and advanced standing will be accorded to those who qualify under this provision.

A student who offers not less than three semester hours of college credit with a grade of "B" or better in one or more of these areas may,

for satisfactory performance in a qualifying examination in the discipline, be granted advanced standing. Entering students who qualify, under this provision must, at the time of application, make request for the privilege of sitting for such an examination.

The core requirement for the entering, or junior student, with advanced standing is ordinarily satisfied by one of the following substitutions:

For Old Testament 11: O.T. 101; 106 A, B, C, D; 196; 201; 202.
For New Testament 18: N.T. 103, 104; 105; 109; 116 A, B, C, 117 A, B, 225.
For Types of Religious Philosophy: T.S. 16.
For Church History 13: C.H. 137; 138; 331; 332.
For Church History 14: C.H. 85; 250; 330.

## ADMISSION ON PROBATION

1. Applicants for admission who are graduates of non-accredited colleges will be considered on their merits. Ordinarily, such applicants must show that they have attained a superior average for a four-year college course.

Admission of such persons will, in every case, be *on probation.*

2. Applicants for admission who are graduates of accredited colleges but whose college transcripts do not fully meet Divinity School standards may be admitted *on probation* if their recommendations otherwise justify admission.

Probation means:

a. Students who, during the first year of Divinity School work maintain less than a "C" average, including one or more failures, ordinarily will be required to withdraw from the School.

b. Students admitted on probation may carry only limited schedules of work, the amount to be determined by the Dean of Students.

c. A student admitted on probation ordinarily shall not be admitted for advanced standing.

Students whose work after admission is not satisfactory may be placed on probation.

## MINISTERIAL AND PROFESSIONAL QUALIFICATIONS

All students who are admitted to academic study in The Divinity School are subject to the established order of administrative regulations of the University and the accepted standards of personal conduct it enjoins; Continuance in the School is conditioned upon acknowledgment of and compliance with such regulations and standards.

In particular, the University and the Divinity School expect and

require students in candidacy for degrees, leading to a ministerial vocation, not only to exemplify the dignity of their calling, but to exhibit attitude and conduct conformable with the recognized standards of their Christian profession. While no "honor system" relating to academic integrity is formalized within the Divinity School, application for and admission to course of study carries with it the student's assent to full compliance with recognized standards of integrity in the fulfillment of academic tasks.

On this prior understanding, therefore, the University reserves the right, and matriculation by the student is a concession to this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge is made against the student.

As a graduate professional school of theology, the Divinity School expects, on the part of the student, an increasing manifestation of maturity and professional purposiveness in discharge of personal and academic responsibilities appropriate to the level of advanced academic work leading to the high and exacting demands of the Christian ministry. Since personal and professional qualifications for the ministry will be considered in evaluating the candidacy of all students for degrees, students whose persons, progress, or development indicate that they are not suited to the work of the ministry will not be allowed to continue in the School.

## FACULTY ADVISERS

Each entering student is assigned to a Faculty Adviser at the time of registration and must report to his Adviser. A student must consult with his Adviser in order to determine his course and cannot complete his registration without the signature of his Adviser. It is understood that all students will continue to consult their advisers at the time of registration throughout the period of their academic work.

## ENGLISH DEFICIENCY

Students whose English testing scores show marked deficiency or who are reported by their instructors as deficient in English usage will be required to take Remedial English in addition to meeting other requirements for the Bachelor of Divinity degree.

## SPEECH DEFICIENCY

At any time in his academic course—on evidence of deficiency in the fundamentals of speech, such as voice or diction—a student may be required to enroll for Speech 34, Workshop in Communication.

Advanced standing does not apply to Professional Courses listed as requirements for Vocational Groups.

# Requirements for the Degree of Bachelor of Divinity

Course requirements are of three kinds: Those of the core curriculum, professional courses, and practicums related to field work. Courses of the core curriculum are required of all students; the professional courses required vary with the prescription of the five Vocational Groups. Practicums are required of students engaged in regular or summer field work.

## REQUIREMENTS FOR THE JUNIOR YEAR

1. Courses of the Core Curriculum.

| | | |
|---|---|---|
| O.T. 11. | Introduction to the Old Testament I | 3 s.h. |
| C.H. 13. | History of the Church to the Protestant Reformation | 3 s.h. |
| C.H. 14. | History of Modern European Christianity | 3 s.h. |
| N.T. 18. | Early Christian Life and Literature | 3 s.h. |
| *T.S. 20. | Types of Religious Philosophy | 3 s.h. |
| H.T. 21. | Theology of the Protestant Reformation | 3 s.h. |

2. Professional Courses.

| | | |
|---|---|---|
| P.S. 10. | I. The Church and the Minister's Vocation | 1 s.h. |
| P.C. 26. | II. Introduction to Pastoral Care | 3 s.h. |
| C.W. 40. | VII. The Church at Worship | 3 s.h. |

Required of all students of the Junior Year

3. Field Work Practicums.

| | | |
|---|---|---|
| Field Work Practicum I | (For Student Pastors) | 1 s.h. |
| Field Work Practicum II | (For Summer Endowment) | 1 s.h. |

## REQUIREMENTS FOR THE MIDDLER YEAR

1. Courses of the Core Curriculum.

| | | |
|---|---|---|
| O.T. 12. | Introduction to the Old Testament II | 3 s.h. |
| N.T. 19. | Introduction to New Testament Theology | 3 s.h. |
| †W.C. 24. | Philosophy of the Christian World Mission | 2 s.h. |
| C.E. 27. | Christian Ethics | 3 s.h. |
| A.C. 28. | History of American Christianity | 3 s.h. |
| C.T. 32. | Christian Theology I | 3 s.h. |
| C.T. 33. | Christian Theology II | 3 s.h. |

2. Professional Courses.

| | | |
|---|---|---|
| C.Ed. 22. | IV Theology and Christian Nurture | 3 s.h. |
| Pr. 29. | III Sermon Construction—Theory | 2 s.h. |
| Pr. 30. | V Sermon Construction—Practice | 1 s.h. |

Professional Course III required of all students in Vocational Groups I, III, IV, V, VI, and, on occasion, II.

* Advanced Standing entitles the student to elect C.C. 16 *Contemporary Western Culture.*
† Required of Vocational Groups I, II and III.

Professional Course IV required of all students in Vocational Groups, I, II, III, and VI. Professional Course V required of all students in Vocational Groups I, III, IV, V, VI, and, on occasion, II.

## REQUIREMENTS FOR THE SENIOR YEAR

I. Professional Courses.

| | |
|---|---|
| C.P. 23. VI The Care of the Parish | 3 s.h. |
| Pr. 31. VIII Preaching (practice) | 1 s.h. |

Professional Course VI is required of students in Vocational Groups I, II, and IV.

Professional Course VII is required of students in Vocational Groups I, II, III, IV, and VI.

Professional Course VIII is required of students in Vocational Group I.

II. Vocational Groups.
Each student, not later than the end of the junior year, shall choose one of the five Vocational Groups and will meet the vocational requirements of the group chosen.

III. Vocational Qualifying Finals.
Each senior student shall complete his academic program during his senior year by registering for and fulfilling the requirements of the qualifying final discipline pertaining to his chosen vocational group.

IV. Free Electives.
The student will choose a sufficient number of courses to make up the total of 90 semester hours required for graduation. Language courses count as free electives.

V. English Bible. A knowledge of the content of the English Bible requisite to the discharge of the teaching and preaching task of the Christian ministry is required and will be tested. Such proficiency must be demonstrated by the end of the student's senior year. Successful completion of Old Testament English Bible I and New Testament English Bible II fulfill this requirement. A student may, however, sit for the final examinations in these courses and by passing them fulfill the requirement, in which latter case he receives no academic credit.

# *Suggested Distribution by Semesters of Required Courses*

## FIRST (JUNIOR) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 10. I The Church and Minister's Vocation | 1 |
| 11. Introduction to the Old Testament I | 3 |
| 13. History of the Church to the Protestant Reformation | 3 |
| 18. Early Christian Life and Literature | 3 |
| 20. Types of Religious Philosophy* | 3 |
| Field Work Practicum I (Student Pastors) | 1 |

| *Second Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 14. Modern European Christianity | 3 |
| 21. Theology of the Protestant Reformation | 3 |
| 26. II Introduction to Pastoral Care | 3 |
| Field Work Practicum II (Summer Field Work) | 1 |
| 40. The Church at Worship | 3 |

15 hours is the normal program, not over 16 hours may be scheduled in either semester.
*Students with Advanced Standing may enroll in C. C. 16, *Contemporary Western Culture.*

## SECOND (MIDDLER) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 19. Introduction to New Testament Theology | 3 |
| 24. Philosophy of the Christian World Mission† | 2 |
| 28. History of American Christianity | 3 |
| 29. III Sermon Construction—Theory | 2 |
| 32. Christian Theology | 3 |

| *Second Semester* | *Semester Hours* |
|---|---|
| *Required in this Semester* | |
| 12. Introduction to the Old Testament II | 3 |
| 22. IV Theology and Christian Nurture | 3 |
| 27. Christian Ethics | 3 |
| 30. V Sermon Construction—Practice | 1 |
| 33. Christian Theology | 3 |

Professional Courses I and II required of all students.
Professional Course III, required of Vocational Groups 1, 3, 4, 5, 6, and on occasion 2.
Professional Course IV, required of all students in Vocational Groups 1, 2, 3, and 6.
Professional Course V, required of all students in Vocational Groups 1, 3, 4, 5, and 6, and on occasion 2.
†Required of students in Vocational Groups 1, 2, 3.

## THIRD (SENIOR) YEAR

| *First Semester* | *Semester Hours* |
|---|---|
| C.P. 23. VI The Care of the Parish | 3 |
| Pr. 31. VIII Preaching (Practice) | 1 |

# *Schedule of Required Courses*

## FIRST YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | N. T. 18 | I P. S. 10 | N. T. 18 | N. T. 18 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | C. H. 13 | Assembly | C. H. 13 | C. H. 13 | |
| 12:00 | C. C. 16 | | C. C. 16 | | C. C. 16 | |
| 2:00 | §T. S. 20 | †Practicum | §T. S. 20 | | §T. S. 20 | |
| 3:00 | O. T. 11 | | O. T. 11 | | O. T. 11 | |

## FIRST YEAR—SECOND SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. H. 14 | C. H. 14 | | C. H. 14 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | VII C.W. 40 | Assembly | VII C.W. 40 | VII C.W. 40 | |
| 12:00 | | | | | | |
| 2:00 | H. T. 21 | ‡Practicum | H. T. 21 | | H. T. 21 | |
| 3:00 | II P. C. 26 | | II P. C. 26 | | II P. C. 26 | |

†For Student Pastors, additional sections of Practicum are available.
‡For Duke Endowment Students, additional sections of Practicum are available.
§Students with Advanced Standing may enroll in C. C. 16, *Contemporary Western Culture*
Professional Courses I and II required of all students.

## SECOND YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. T. 32 | C. T. 32 | | C. T. 32 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | A. C. 28 | Assembly | A. C. 28 | A. C. 28 | |
| 12:00 | | III Preaching 29 | | III Preaching 29 | | |
| 2:00 | N. T. 19 | W. C. 24 | N. T. 19 | W. C. 24 | N. T. 19 | |

## SECOND YEAR—SECOND SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | C. T. 33 | C. T. 33 | | C. T. 33 | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | C. E. 27 | Assembly | C. E. 27 | C. E. 27 | |
| 12:00 | | IV C. Ed. 22 | IV C. Ed. 22 | V Preaching 30 | IV C. Ed. 22 | |
| 2:00 | O. T. 12 | | O. T. 12 | | O. T. 12 | |

## THIRD YEAR—FIRST SEMESTER

| *Hour* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* | *Saturday* |
|---|---|---|---|---|---|---|
| 8:10 | | | | | | |
| 9:10 | | | | | | |
| 10:10 | | Chapel | Chapel | Chapel | Chapel | |
| 11:00 | | | Assembly | | | |
| 12:00 | | VI C. P. 23 | VIII Pr. 31 | VI C. P. 23 | VI C. P. 23 | |
| 2:00 | | | | | | |

## VOCATIONAL GROUPS

In recognition of the existing and growing diversity of function within the 20th century Protestant Christian ministry, the program of studies leading to the B.D. degree has been designed to afford variability of emphasis within a basic unity. The core curriculum of basic theological studies provides uniform requirements for all. Variability of emphasis derives from the carefully tailored requirements peculiar to each vocational group. Election of a vocational group is election of a cluster of required courses regarded as providing adequate conversancy with a range of subject matter most pertinent to the special emphasis of the vocational group.

Each student shall choose his vocational group during the second semester of his first or Junior year and give notice of his choice to the office of the Dean of Students not later than May 1.

The student is urged to consult his faculty adviser in making his selection of a vocational group. Students electing Vocational Group I will be certified for that group by the Dean of Students. Students electing Vocational Group II shall have the approval of Professor Kale; those electing Vocational Group III, the approval of Professor Lacy; those electing Vocational Group IV, the approval of Professor Goodling. Students electing Vocational Group V or VI shall have the approval of the Dean and must offer an average of "B minus" or better for the academic record of their junior year. Choice of a vocational group is regularly subject to review of the Dean, and the right to require alteration of election is reserved.

A qualifying final discipline is attached to each vocational group and constitutes a requirement for graduation. Open to students in their senior year, it carries two semester hours credit. See page 34.

Electives in sufficient amount to complete 90 hours for graduation will be taken.

### I. THE PARISH MINISTRY

A student electing Vocational Group I shall plan his program to include one course at a level higher than the core requirement from six of the following areas:

Biblical Studies
Care of the Parish
Christian Education
Historical Studies
Pastoral Care
Church at Worship
Theological Studies

This Vocational Group requires the following Professional Courses: III, IV, V, VI, VII, VIII, and Philosophy of Christian World Mission.

### II. THE MINISTRY OF CHRISTIAN EDUCATION

A student should plan his courses so as to include three of the following Christian Education courses: 125, 126, 161, 162, 169 and at least one course from among the following: 164, 165, 166. In addition the student should take one advanced course in each of the following fields: Christian Theology, Bible, American Christianity, Historical Theology or Church History, Christian Ethics, Pastoral Care, and Worship.

This Vocational Group requires the following Professional Courses: IV, VI, VII, and Philosophy of Christian World Mission.

Those students planning to pursue the Ministry of Christian Education within the Parish Ministry may also in certain circumstances be advised to take Professional Courses III and V.

### III. THE MINISTRY OF MISSIONS

The student should plan his course so as to include the following courses in Missions and related subjects: W.C. 24, 133, and W.C. 156, H.R. 158, C.E. 190. In addition he should take at least one advanced course in Biblical Studies; and one in Theology or Historical Theology; and at least one of the following courses, depending on his field of anticipated service: H.R. 179, H.R. 180, H.R. 182, or T.S. 213 (with appropriate substitutions if these are not offered).

Professional Courses III, IV, V, and VII are required of this group.

### IV. THE MINISTRY OF PASTORAL CARE

In addition to the required course in Pastoral Care, P.C. 26, the student should plan his program so as to include the following: P.C. 170; P.C. 171 or 172; P.C. 177; P.C. 174 or 188; C.T. 125 or T.S. 102; H.T. 121 or one advanced course in Church History. Students must also take one advanced course in *each* of the following areas: Christian Theology; Christian Ethics or Christianity and Culture; Biblical Studies.

Professional Courses III, V, VI*, and VII are required of this group.

### V. THE MINISTRY OF TEACHING

A student electing Vocational Group V shall declare his major during the second semester of his first or junior year and shall select for concentration five of the areas listed below of which one shall be the designated major in which he shall take not less than nine semester hours. He shall in addition, ordinarily, take not less than five semester hours in each of the other four areas. Normally, the above requirements are met by courses of advanced level; however, introductory courses of the Core Curriculum, not already taken as standard requirements of the Junior and Middler years may be included as fulfilling the major and minor areas of study.

| | |
|---|---|
| American Christianity | Historical Theology |
| Christian Education | History of Religions |
| Christian Ethics | New Testament |
| Christianity and Culture | Old Testament |
| Church History | Theology and Philosophy of Religion |

Professional Courses I; II; and III and V, or IV.

### VI. THE MINISTRY TO THE CAMPUS

Students electing this group are required to take at least one advanced course in Christianity and Culture, and one advanced course in Pastoral Care. They are also required to take C.P. 149. In addition, they are advised to select electives in consultation with the director of Vocational Group VI in such fashion to maintain balance between the several disciplines.

Students of this group are required to serve an apprenticeship which may be accomplished in either of two ways:

1. A student may work part-time for one academic year as commuting active staff member of a denominational college chaplaincy program currently operating on one of the campuses within a fifty-mile radius of Duke University. Specific assignments and terms of employment as permitted by the academic load of the student would, in such cases, be arrived at in consultation with the director of Vocational Group VI and the Dean of Students.

2. A student may apply to an appropriate foundation (or other comparable agency) for grant to work full time for a year as a Seminary intern in a college campus situation and, if he is awarded such a grant, fulfill in this way the

* C.Ed. 161 or 162 may be substituted for Professional Course VI.

apprenticeship requirement. Students of Group VI are encouraged to apply for such a grant before proceeding otherwise.

A student's association as intern or member of chaplain's staff will be recorded on his transcript. Regular reports of the student's activity and performance are to be made by the student and by his immediate supervisor during the term of his work as intern or staff member.

Professional courses III, IV, V, and VII are required of this group.

## SENIOR VOCATIONAL QUALIFYING FINALS

Each student must, as a requirement for graduation, complete the qualifying discipline of his chosen Vocational Group as described below:

*For Vocational Group I:* On the basis of Biblical materials designated by instructors and developed according to method and standards described in exemplary lectures given by a faculty panel, a student of this group is to provide the following: (a) a complete, written exegesis of an assigned Biblical text, (b) a written explanation of the theology implicit and explicit in the passage, together with a written statement of his credo regarding the theology discussed, and (c) the manuscript of an expository sermon embodying the exegetical insights and theological position set forth in (a) and (b).

*For Vocational Groups II and III:* A student of either of these groups presents to a specified committee of the faculty an essay on an assigned subject. For credit the essay must, in the opinion of the committee, demonstrate the relation of the student's choice of particular field to his total program of study.

*For Vocational Group IV:* Each student electing this group must complete the seminar in the Theology of Pastoral Care, staffed by an interdisciplinary committee of the faculty, and present to the committee a paper on an assigned subject during the course of the seminar.

*For Vocational Group V:* A student of this group must take a seminar involving coalition between at least two of the disciplines of historical, Biblical, and theological studies. Opportunity and responsibility for conducting class sessions through reports, discussion-direction, and consultation will afford distinctive experience in the teaching situation.

*For Vocational Group VI:* Students of this group are not required to take a qualifying final but must fulfill the demands of an apprenticeship described above.

Students of Groups I and V normally fulfill the above requirements during their fifth or sixth semester of residence. Students of Groups II and III normally receive assignments early in the fifth semester of residence and complete the assignment before graduation, although the date by which assignments must be completed may be set at the

discretion of the student's committee. Students of Group IV normally take their seminar in the sixth semester of residence. The qualifying discipline for each group carries, when successfully completed, two semester hours' credit.

## ADMINISTERING THE CURRICULUM

For the administration of the curriculum the following regulations have been adopted:

Full-time students must take the required courses as specified for the respective semesters.

The schedules of all students are subject to review and approval of the Dean and the Committee on Academic Standing.

*Students entering* (Students who entered the Divinity School prior to September 1963 are governed by *announcements for 1962-63,* Divinity School catalogue, page 37) *the Divinity School in candidacy for the B.D. degree under the catalogue of 1963-64, and who accept student pastorates are advised that their program of study will require a fourth year. Students with pastoral charges will enroll for not less than eight nor more than twelve semester hours in any given semester.*

Ordinarily, a student enrolled in candidacy for the B.D. or M.R.E. shall enroll for no less than eight semester hours in any semester.

Not over 30 semester hours of Summer Session work may be credited toward the degree of Bachelor of Divinity.

The status of "special student" may not be granted simply to permit avoidance of the schedule of required courses. Every request for this classification will be carefully investigated and approval of the Dean is required.

A fee of $15.00 is charged for auditing any course except where a student is already paying regular University fees. Permission to audit requires the approval of the Dean and the instructor concerned.

Student pastors and students working under the Duke Endowment Summer Field Work program of the Rural Church, are required to take one of the Field Work Practicums.

## LANGUAGE STUDY

For a student planning to take both Greek and Hebrew: the Greek may be continued in the second year by postponing N.T. 19 in the fall semester and waiving O.T. 12 in the spring semester.

A student who takes six hours of N.T. language may be excused from either N.T. 18 or N.T. 19; one who takes six hours of O.T. language may be excused from either O.T. 11 or O.T. 12, depending on the year in which he takes Hebrew.

A part-time student who desires to begin the study of Greek in the first year may postpone the required course in Old or New Testament.

Suitable entry will be made on the permanent record of any student who is granted permission to deviate from the requirements in the matter of language.

## GRADUATION CREDITS

It is the responsibility of each student to see that he meets all requirements for graduation, and to take his courses in proper sequence. He is also responsible for seeing that any special permission granted him to deviate from the normal program is properly recorded in his personal files. Deviations from a normal academic program must be approved by the Dean of Students as representative of the Dean of the Divinity School.

## GRADING SYSTEM

The grading system of the Divinity School employs the letters A, B, C, D, and F, which have been defined as follows: A = Excellent; B = Superior; C = Average; D = Inferior; F = Failure; WP = Withdrew Passing; WF = Withdrew Failing; WI = Withdrew Illness and I = Incomplete; P, Passed. (See below.) No percentage equivalents are stated. A student is expected to maintain an average of C.

In all courses where the instructor considers attendance a necessary part of the work of the course, a student may not receive a grade of over C if his absences total 12% of the regular class periods, and if the absences total 24% of the class periods he may not receive credit for the course.

## INCOMPLETES

A student may, with the permission of the instructor concerned, petition the Dean of Students to receive a grade of "incomplete" in a course. Such permission may be granted when a student, through some circumstance beyond his control, such as illness, has been hindered from meeting the course requirements. No "incomplete" is recorded without permission in writing from the Dean of Students. Ordinarily, an "incomplete" will not be approved in the case of students completing their academic work in the fall semester. An "Incomplete" automatically becomes an "F" unless it is removed through completion of assigned work by the following dates:

For "Incompletes" incurred in fall semester courses, March 15, following

For "Incompletes" incurred in spring semester courses, October 15, following

For "Incompletes" incurred in summer courses, October 15, following.

Ordinarily, a fee of $10.00 shall be charged in the case of each "incomplete" allowed to a student.

## CHANGE OF COURSE OR WITHDRAWAL

A student is permitted to change his registration for course work without incurring a penalty no later than completion of the second meeting of the course from which he desires to withdraw or, correspondingly, of the course to which he seeks admission. All such changes shall be approved by a member of the Registration Committee.

No student shall be permitted to drop a course after the expiration of one-third of the period of instruction of the course without incurring failure, except for causes adjudged by the Dean or Dean of Students to be beyond the student's control. Conditions of emergency and not considerations of convenience shall be regarded as determinative in considering requests.

## GRADUATION WITH DISTINCTION

Students who achieve a grade point average of 3.75 (A, 4; B, 3; C, 2; D, 1) for over-all academic record in the Divinity School are granted the degree of Bachelor of Divinity, *summa cum laude*. Students with a grade point average of 3.5 are awarded the degree, *magna cum laude*. Such distinction is specified on their diplomas.

# Requirements for the Degree of Master of Religious Education

THE course of study leading to this degree is designed for persons desiring to engage in various forms of Christian Education.

Candidates for this degree must hold the degree of A.B. (or its equivalent), based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and with academic and personal records which afford promise of competence in this area of service. The course of study will be especially useful for individuals who have had one or more years of experience in Christian Education and desire further training. Candidates for this degree will be limited in number, and individuals interested are urged to apply for admission well in advance of the opening of the academic year. All work offered for this degree, whether in the regular year or in summer sessions, must be completed within a period of six years from the date of beginning.

It is desirable that each applicant for admission show a "B" average in his college work. An applicant must show a college average of not less than "B–."

## PREREQUISITES

Three of the following five prerequisite studies must have been taken by the candidate prior to his admission to the Divinity School or must be secured, without credit toward the M.R.E. degree, after being admitted:

| | |
|---|---|
| General Psychology | 3 s.h. |
| Sociology | 3 s.h. |
| Education | 3 s.h. |
| Philosophy | 3 s.h. |
| Religion | 3 s.h. |

## GENERAL REQUIREMENTS

Sixty semester hours of graduate-professional work are required for graduation. Not more than twelve semester hours of this work may be taken in approved summer sessions.

No credits are allowed for undergraduate courses. However, in approving plans of study leading to this degree, consideration will be given to earlier work taken in the fields of Biblical studies and Christian Education provided such courses were taken in the Junior and Senior years in accredited four-year colleges. Also, where candi-

dates for the degree have been engaged professionally as Directors of Christian Education for not less than twelve months prior to entering the Divinity School the amount of Field Work may, upon recommendation of the Director of the M.R.E. program and the approval of the Dean, be reduced to not less than three hours of Project or Directed Field Work during the period required for completing requirements for the degree.

A student who secures credit for 15 semester hours each semester will be in line for graduation at the end of two academic years. The amount of work allowed in each semester may not exceed that permitted in the B.D. curriculum.

Candidates must also pass the English Bible examinations or equivalent described under requirements for the B.D. degree. Normally these examinations are taken in the second year of the M.R.E. program, but, with permission of the Director of the M.R.E. program, may be taken during the student's first year of residence.

## COURSE REQUIREMENTS FOR THE M.R.E. DEGREE

| *Subject* | *Required Semester Hours* |
|---|---|
| Biblical Studies (O.T. and N.T.) | 9 to 12 |
| Church History, Historical Theology and American Christianity | 9 in two or more of these fields |
| Christian Theology | 3 to 6 |
| Philosophy of Religion or Christian Ethics | 3 |
| Worship | 3 |
| Pastoral Care | 3 |
| Christian Education (including missionary education) | 11 |
| Christian Education Practicum | 3 |
| Required Hours | 44 to 50 |
| Electives | 10 to 16 |
| TOTAL | 60 |

# Requirements for the Degree of Master of Theology

THE course of study leading to the degree of Master of Theology is designed for graduates of accredited theological schools who desire to continue or resume their theological education for enhancement of professional competence in selected areas of study. Enrollment in the Th.M. program is open to a limited number of students who have received the B.D. (or the equivalent) with superior academic records.

## GENERAL REQUIREMENTS

The general requirements for the degree of Master of Theology are:

(1) thirty semester hours of advanced studies, with a minimum grade of "B" in each course;

(2) superior performance in a comprehensive examination covering the major and minor areas of study;

(3) residence for one academic year.

There are no general language requirements, but classical or modern languages may be required for certain courses (for example, Hebrew or Greek in Biblical studies.)

## THE PROGRAM OF STUDY

At least twelve of the required thirty hours must be taken in one of the basic divisions of study (Biblical, Historical, Theological, or Professional) which shall be designated as the candidate's major; and at least six hours in another of the divisions which shall be designated as the candidate's minor. No more than twelve hours may be taken in summer sessions. No more than six semester hours of work completed in another accredited institution may be transferred and credited toward the degree. Ordinarily, no more than six hours may be taken through directed reading, and no more than three in any one semester or summer term. In the area of Pastoral Care, up to fourteen hours may be taken through clinical training.

The major in Pastoral Care requires a calendar year. The candidate normally begins his training June 15 with 12 weeks of full-time clinical training.

Each student will plan his program of courses and directed reading

or clinical training with the guidance of a committee of two to be appointed by the Director of the Master's Program. The committee will include a professor in the student's major area of interest, who will act as chairman, and a professor in the minor area. The chairman, in consultation with the Director and the other member of the committee, will prepare, administer, and evaluate the comprehensive examination.

The comprehensive examination will be given at the close of the course of study for the degree, ordinarily in May or September.

The entire program of studies and comprehensive examination should be completed within twelve months. In exceptional cases, the time limit may be extended, but in no case beyond three years.

# Courses of Instruction*

REQUIRED courses are numbered from 10 to 70. Elective courses carrying credit in the Divinity School only are numbered from 71 to 199. Courses approved for credit in both the Divinity School and the Graduate School of Arts and Sciences are numbered above 200. Lists of courses to be offered in any semester will be available at the time of each registration.

## *I. Biblical Studies*

### OLD TESTAMENT

OLD TESTAMENT ENGLISH BIBLE I. (Meets two hours weekly.) 1 s.h. MR. EFIRD

11. INTRODUCTION TO THE OLD TESTAMENT I.—The origin, literary forms, and contents of the books of the Old Testament in their geographical and historical setting on the Exile. 3 s.h. MR. STINESPRING

12. INTRODUCTION TO THE OLD TESTAMENT II.—Introduction to and interpretation of Exilic and post-Exilic prophecy, Psalms, wisdom literature, the Chronicler, apocalyptic, and the Apocrypha. 3 s.h. MR. STRUGNELL

101. POST-EXILIC PROPHECY.—A study of the post-Exilic prophets from Ezekiel to Daniel, with special reference to Messianic prophecy and related theological problems. 2 s.h. MR. STRUGNELL

106. EXEGESIS OF THE ENGLISH OLD TESTAMENT.—A. A book of the Pentateuch; B. A prophetical book; C. A historical book; D. Selected poetical materials. (O.T. 106 A, O.T. 106 B, O.T. 106 C, and O.T. 106 D are separate courses, offered in different semesters.) Prerequisite: O.T. 11 or the equivalent. 2 s.h. STAFF

196. THE BIBLE AND RECENT DISCOVERIES.—A survey of the contribution of the cultural setting of the Bible as an aid to its understanding. 3 s.h. MR. STRUGNELL

201-202. FIRST HEBREW.—The principles and structure of the Hebrew language with translation of selected Old Testament narratives. One year of Greek prerequisite. 6 s.h. MR. STINESPRING

207. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament prose (Pentateuch and historical books in alternate years). First semester. 3 s.h. STAFF

208. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament poetry (Prophets and the Writings in alternate years). Second semester. 3 s.h. STAFF

209. BIBLICAL THEOLOGY.—A study of the Old and New Testaments in regard to their theological relationship. Prerequisite: O.T. 11 and N.T. 19. 3 s.h. MR. ANDERSON

301. THE THEOLOGY OF THE DEAD SEA SCROLLS.—A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. Prerequisite: O.T. 11. 3 s.h. MR. STRUGNELL

* On approval of the Dean, courses offered in the Graduate School of Arts and Sciences other than those approved for credit in the Divinity School may be approved for credit in individual cases, provided no equivalent course is offered in the Divinity School; each case to be decided on its merits.

302. STUDIES IN THE INTERTESTAMENTAL LITERATURE.—Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 s.h. MR. ANDERSON

304. ARAMAIC.—A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 s.h.
MR. STINESPRING OR MR. STRUGNELL

305. THIRD HEBREW.—An interpretative study of late Hebrew prose, with reading from Chronicles, Ecclesiastes, and the Mishnah. 3 s.h. MR. STINESPRING

306. LANGUAGE AND LITERATURE OF THE DEAD SEA SCROLLS.—A study in interpretation. Prerequisite, a knowledge of Hebrew. 3 s.h.
MR. STRUGNELL

307. SYRIAC.—A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 s.h. MR. STINESPRING

309. HISTORY OF THE ANCIENT NEAR EAST.—A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 s.h. MR. STINESPRING

310. OLD TESTAMENT PROPHECY.—The prophetic movement in Israel with special emphasis on the theological standpoint of the prophets of the eighth century B.C. Prerequisites: O.T. 11 and O.T. 12. 3 s.h. MR. STINESPRING

*HISTORY OF ART 215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—The development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part Syria and Palestine to the Persian conquest. 3 s.h. MR. MARKMAN

*HISTORY OF ART 216. RELIGIOUS ART OF THE CLASSICAL WORLD.—The religious art, particularly architecture and sculpture, of Greece and Rome with special emphasis on the monuments in the Near East. 3 s.h. MR. MARKMAN

## NEW TESTAMENT

NEW TESTAMENT ENGLISH BIBLE II. (Meets two hours weekly.) 1 s.h.
MR. EFIRD

18. EARLY CHRISTIAN LIFE AND LITERATURE.—A basic study of the civilization in which Christianity began; the origin and development of the Christian Church and its literature through the second century. 3 s.h. MR. EFIRD

19. INTRODUCTION TO NEW TESTAMENT THEOLOGY.—A constructive analysis and exposition of the positive doctrinal content of the New Testament. Prerequisite: N.T. 18. 3 s.h. MR. ANDERSON

103-104. HELLENISTIC GREEK.—Designed for beginners to enable them to read the Greek New Testament. 6 s.h. (Two sections) STAFF

105. STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 2 s.h. MR. ANDERSON OR OTHERS

116. EXEGESIS OF THE ENGLISH NEW TESTAMENT I.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles. (N.T. 116 A, N.T. 116 B, and N.T. 116 C are separate courses, offered in different semesters.) 2 s.h.
MR. ANDERSON OR OTHERS

117. EXEGESIS OF THE ENGLISH NEW TESTAMENT II.—A. The Gospel and Epistles of John; B. Romans. (N.T. 117 A and N.T. 117 B are separate courses, offered in different semesters.) 2 s.h. MR. PRICE OR OTHERS

217. THE NEW TESTAMENT IN GREEK.—Extensive reading of the Greek text of the New Testament, with special emphasis upon its interpretation. Prerequisite: six semester hours' study of the Greek language. 3 s.h. STAFF

* Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

225. LIVING ISSUES IN NEW TESTAMENT THEOLOGY.—Examination of recent major questions of debate in the New Testament field. Prerequisite: N.T. 19. 3 s.h. MR. ANDERSON

226. EXEGESIS OF THE GREEK NEW TESTAMENT I.—A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. MR. PRICE

227. EXEGESIS OF THE GREEK NEW TESTAMENT II.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. MR. ANDERSON

318. TEXTUAL CRITICISM OF THE NEW TESTAMENT.—A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. Prerequisite: N.T. 103-104, or the equivalent. 3 s.h. MR. CLARK

340-341. SEMINAR IN THE NEW TESTAMENT.—Research and discussion on a selected problem in the Biblical field. 2 s.h. MR. ANDERSON AND/OR MR. PRICE

SEE ALSO Pr. 185 and O.T. 209.

*GREEK 257.—The social and cultural history of the Hellenistic world from Alexander to Augustus. 3 s.h. MR. ROGERS

*LATIN 258.—The social and cultural history of the Graeco-Roman world. 3 s.h. MR. ROGERS

# *II. Historical Studies*

## CHURCH HISTORY

13. HISTORY OF THE CHURCH TO THE PROTESTANT REFORMATION.—A survey through the fifteenth century in terms of spiritual genius, organizational development, great literature, and representative movements. 3 s.h. MR. PETRY

14. HISTORY OF MODERN EUROPEAN CHRISTIANITY.—A survey of the main currents in Reformation and post-Reformation church history. 3 s.h. MR. HILLERBRAND

85. SEMINAR IN MODERN EUROPEAN CHRISTIANITY.—A seminar devoted to the study of select aspects of Reformation and Post-Reformation Church History. This year the seminar will consider Reformation and Post-Reformation Confessions of faith. Prerequisite: C.H. 13-14. 2 s.h. MR. HILLERBRAND

137. RELIGIOUS LEADERS IN CHRISTIAN HISTORY.—Representative leaders in the early and medieval church studies in relation to contemporary churchmanship. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

138. GREAT BOOKS IN CHRISTIAN HISTORY.—An intensive study of Augustine's *Confessions,* Thomas à Kempis' *Imitation of Christ,* Erasmus's *Complaint of Peace,* Luther's *Christian Liberty,* Calvin's *Instruction in Faith,* and Andrewes' *Private Devotions.* 3 s.h. MR. PETRY

139. METHODISM.—A study of Methodist societies in England and the developing church in America as they gave rise to such historic issues as polity, education, division, and reunion. Prerequisite: C.H. 13. 2 s.h. MR. PETRY

140. THE RISE OF METHODISM AND THE ANGLICAN BACKGROUND.—The Methodist societies within the Church of England to the death of Wesley. Prerequisite: C.H. 13-14. 3 s.h. MR. BAKER

(Students are advised that either C.H. 139 or C.H. 140 will satisfy the Methodist Discipline Requirement No. 344.)

* Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

142. BRITISH METHODISM AFTER WESLEY.—British Methodism in its nineteenth and twentieth century development. Prerequisite: C.H. 14. 3 s.h. MR. BAKER

250. THE REFORMATION AND COUNTER REFORMATION.—History and thought of European Christianity between 1517-1680. 3 s.h. MR. HILLERBRAND

251. PIETISM, DEISM, AND RATIONALISM.—History and thought of European Christianity between 1650 and 1750. 3 s.h. MR. HILLERBRAND

330. THE CHURCH IN EUROPE SINCE 1800.—Emphasis is placed on the relation of the church to the social, economic, and political life of Modern Europe. Particular attention is given to Papal pronouncements on social issues, the relationship of Eastern to Western Institutions, and ecclesiastical historiography as it involves source editions, periodicals, and ecumenical literature. 3 s.h. MR. PETRY

331. THE SOCIAL MESSAGE OF THE EARLY AND MEDIEVAL CHURCH.—A study of the social teachings and contribution of the Christian church prior to the Protestant Reformation. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

332. THE MEDIEVAL CHURCH.—Outstanding characteristics of the medieval church, emphasizing theory, polity, institutions, sacraments, and worship. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

334. CHURCH REFORMERS AND CHRISTIAN UNITY.—The work of such reformers as Marsilius of Padua, William of Ockham, Jean Gerson, Pierre d'Ailly and Nicholas of Cusa in relation to ecclesiastical schism and the search for Christian unity through representative councils. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

336. CHRISTIAN MYSTICISM IN THE MIDDLE AGES.—Source studies, in historical perspective, of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. Prerequisite: C.H. 13. 3 s.h. MR. PETRY

339. LEFT WING MOVEMENTS OF THE REFORMATION.—A survey of the history and theology of the "radical" Reformation. 2 s.h. MR. HILLERBRAND

## HISTORICAL THEOLOGY

21. THE THEOLOGY OF THE PROTESTANT REFORMATION.—The Reformation of the 16th century and its outcome in the 17th and 18th centuries. 3 s.h. MR. GRISLIS

111. LITERATURE OF THE LATIN CHURCH.—Readings, in the Latin originals, of diverse kinds of writing produced by the Latin Church in various periods of its history. Prerequisite: Permission of instructor. 3 s.h. MR. STRUGNELL

120. FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles' the Nicene and the Chalcedonian Creeds in their contemporary setting. 3 s.h. MR. GRISLIS

121. SACRAMENTS IN THE CHRISTIAN CHURCH.—Ecumenical studies in devotion and division: Baptism and the Lord's Supper. 3 s.h. MR. GRISLIS

123. THE THEOLOGY OF THE EARLY CHURCH.—An introduction to the history of doctrine from the 2nd to the 6th centuries. 3 s.h. MR. GRISLIS

129. CRITICS OF CHRISTIANITY.—A Survey of Anti-Christian Polemics from Celsus to Nietzsche. 2 s.h. MR. HILLERBRAND

234. THE THEOLOGY OF THOMAS AQUINAS.—A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 s.h. MR. GRISLIS

240. THE THEOLOGY OF RICHARD HOOKER.—An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 s.h. MR. GRISLIS

260. SEMINAR: LIFE AND THOUGHT OF THE WESLEYS.—A seminar on John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Permission of instructor. 3 s.h. MR. BAKER

261. THE THEOLOGY OF JOHN WESLEY.—A study of the development and structure of Wesley's theology, with special reference to his doctrines of man and salvation. Prerequisite: Permission of instructor. 2 s.h. MR. RICHEY

337. THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 2 s.h. MR. HILLEBRAND

338. THE THEOLOGY OF JOHN CALVIN.—An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. Prerequisite: H.T. 21. 3 s.h. MR. GRISLIS

## AMERICAN CHRISTIANITY

28. HISTORY OF AMERICAN CHRISTIANITY.—A consideration of the nature of Christianity in America and the history of its development. 3 s.h. MR. HENRY

199. THE AMERICAN SOCIAL GOSPEL.—A study of Protestant social thought and action in America since 1865. 3 s.h.

296. RELIGION ON THE AMERICAN FRONTIER.—A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. Prerequisite: A.C. 28. 3 s.h. MR. HENRY

372. THEOLOGY OF PAUL TILLICH.—An examination of Tillich's philosophical theology. 2 s.h. MR. ROBINSON

385. RELIGION IN AMERICAN LITERATURE.—A critical study of the meaning and value of religious motifs reflected in American literature. 3 s.h. MR. HENRY

395. CHRISTIAN THOUGHT IN COLONIAL AMERICA.—Exposition of the main currents in Protestant Theology. 3 s.h. MR. HENRY

396. LIBERAL TRADITIONS IN AMERICAN THEOLOGY.—A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 s.h. MR. HENRY

397. CONTEMPORARY AMERICAN THEOLOGY.—A critical appraisal of major tendencies. 3 s.h. MR. HENRY

## WORLD CHRISTIANITY

24. PHILOSOPHY OF THE CHRISTIAN WORLD MISSION.—A study of theological foundations, guiding principles, and contemporary problems of the World Christian Community. 2 s.h. MR. LACY

133. HISTORY OF CHRISTIAN MISSIONS.—A survey of the spread of Christianity with special emphasis on 19th and 20th century Protestantism. 2 s.h. MR. LACY

135. AREA STUDIES OF THE CHRISTIAN CHURCH.—The cultural setting and current programs and policies of the Church in one of the following areas: a. Latin America, b. India and Pakistan, c. Africa, d. Southeast Asia, e. Japan-Korea-Philippines, f. Moslem Lands, or g. United States Home Missions. (The area of study to be determined by student interest in consultation with the instructor.) 2 s.h. MR. LACY AND OTHERS

156. THE ECUMENICAL MOVEMENT.—Its contemporary development, structures, activities—and problems, against the background of Church unity and disunity. 3 s.h. MR. LACY

386. SEMINAR: THEOLOGICAL TRENDS IN THE WORLD CHURCH.—Contemporary currents of Christian thought as they affect the resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 s.h. MR. LACY

SEE ALSO: C.Ed. 126, C.E. 190. C.E. 292, and C.E. 333.

## HISTORY OF RELIGIONS

158. CONTEMPORARY NON-CHRISTIAN RELIGIONS.—Critical consideration of contemporary conditions in major non-Christian traditions, with special reference to Hinduism, Buddhism, Islam, and African Religions. 3 s.h.
MR. SULLIVAN

179. RELIGIONS OF THE FAR EAST.—Historical and theological introduction to the major indigenous traditions of China and Japan. 3 s.h. MR. SULLIVAN

180. RELIGIONS OF THE NEAR EAST.—Historical and theological introduction to the major indigenous traditions of the Near East, especially Zoroastrianism, and Islam. 3 s.h. MR. PARTIN

182. RELIGIONS OF INDIA.—Historical and theological introduction to Indian religious life and thought. The development of Buddhism is covered, as well as Jainism and Sikhism, along with the various modes of Hinduism. 3 s.h.
MR. SULLIVAN

280. THE HISTORY OF RELIGIONS.—A study of the methodology of the History of Religions, the nature of religious experience and specific categories of religious phenomena. Permission of instructor. 3 s.h. MR. SULLIVAN

# *III. Theological Studies*

## PHILOSOPHY OF RELIGION

20. TYPES OF RELIGIOUS PHILOSOPHY.—Basic historical orientation in religious thought, especially in Western Culture. 3 s.h. MR. LANGFORD

102. CHRISTIAN APOLOGETICS AND MODERN WORLD VIEWS.—A constructive approach to the Hebrew-Christian understanding of Creator and creature in the light of contemporary scientific knowledge. 3 s.h. MR. ROBINSON

## CHRISTIAN THEOLOGY

32. CHRISTIAN THEOLOGY I.—A constructive statement of the themes of systematic theology as a task of the church today: theological method, knowledge of God, man, and Christ. 3 s.h. MR. CUSHMAN AND MR. HALL

33. CHRISTIAN THEOLOGY II.—God the redeemer, the church, word and sacraments, authority and ministry, the Kingdom of God. 3 s.h. MR. HERZOG

108. REVELATION AND AUTHORITY.—A study of the relationship between revelation, Bible, preaching and the church. 3 s.h. MR. HERZOG

110. THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 3 s.h. MR. ROBINSON

*125. THEOLOGICAL AND PSYCHOLOGICAL INTERPRETATIONS OF MAN.—An inquiry into the relations of theological and psychological views of man's nature, predicament, and deliverance. 3 s.h. MR. RICHEY

195. ORIGINS OF DOGMATIC THOUGHT.—An analysis of dogmatic concepts in the Gospel of John: their development into a body of doctrine. 3 s.h.
MR. HERZOG

200. THE PERSON AND WORK OF CHRIST.—The problem of knowledge of Christ and formulation of a doctrine of his work and person in the light of Biblical eschatology. Prerequisite: C.T. 32-33. 2 s.h. MR. CUSHMAN OR MR. HALL

213. THE STRUCTURE OF ROMAN CATHOLIC THOUGHT.—The main characteristics of Roman Catholic theology with consideration of possibilities and limitations in ecumenical conversation with Rome. Prerequisites: C.H. 13 and 14 and H.T. 21. 3 s.h. MR. HERZOG

216. KIERKEGAARD STUDIES.—Critical examination of selected works. Prerequisite: C.T. 32 or permission of the instructor. 3 s.h. MR. ROBINSON

* May be taken and grade recorded as Christian Educ. 125.

224. CONCEPTIONS OF MAN IN WESTERN THOUGHT.—An analysis and interpretation of important types of philosophical and theological theory. 3 s.h. MR. RICHEY

303. DOGMA AND THE PROBLEM OF HISTORY.—The authority of Kerygma and the Word of God in twentieth-century European theology. 3 s.h. MR. HERZOG

320. SEMINAR: FRIEDRICH SCHLEIERMACHER.—Critical examination of the dogmatic system. Prerequisite: C.T. 322. 3 s.h. MR. HERZOG

321. PLATONISM AND CHRISTIANITY.—An analysis of Plato's religious philosophy and a survey of its continuing influence in Hellenistic and Christian thought. Prerequisite: six semester hours in theology. 3 s.h. MR. CUSHMAN

322. NINETEENTH CENTURY EUROPEAN THEOLOGY.—Protestant theology from Kant to Herrmann. 3 s.h. MR. HERZOG

323. SEMINAR: BULTMANN.—Critical examination of representative works, with some consideration of relation to the work of Martin Heidegger. Prerequisite: C.T. 32-33 or permission of the instructor. 3 s.h. MR. ROBINSON

325. PHILOSOPHICAL THEOLOGY I.—Main problems in the history of philosophical theology from the pre-Socratics to Descartes. Prerequisite: C.T. 32-33. 3 s.h. MR. CUSHMAN OR MR. ROBINSON

326. PHILOSOPHICAL THEOLOGY II.—Main problems of philosophical theology in the modern period. Prerequisite: C.T. 325. 3 s.h. MR. CUSHMAN OR MR. ROBINSON

328. SEMINAR IN TWENTIETH CENTURY EUROPEAN THEOLOGY.—Critical examination of the thought of selected representative theologians. Prerequisite: permission of instructor. 3 s.h. MR. HERZOG

## CHRISTIANITY AND CULTURE

16. CONTEMPORARY WESTERN CULTURE.—An analysis of the conceptual commitments in contemporary styles of thought and life as reflected in the natural sciences, philosophy, social analysis, and the arts. 3 s.h. MR. POTEAT

80. THE CHRISTIAN FAITH AND TRAGEDY.—An exploration of the tragic view of life as exhibited in selected classic and contemporary works of literature and a comparison of this with Christian belief. 3 s.h. MR. POTEAT

81. RECENT AND CONTEMPORARY ART AND THEOLOGY.—The study of 19th and 20th century painting and sculpture as documents of contemporary man's apprehension of himself and his world; and as elements in the conversation between Christian faith and culture. 3 s.h. MR. POTEAT

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

231. SEMINAR IN CHRISTIANITY AND CONTEMPORARY THOUGHT.—Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relavance for theological inquiry. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

380. EXISTENTIALIST THOUGHT.—An analysis of writings of representative thinkers from Kierkegaard to Sartre. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. MR. POTEAT

## CHRISTIAN ETHICS

27. CHRISTIAN ETHICS I.—The central assumptions and principles of the Christian conception of the good life. 3 s.h. MR. BEACH

114. CHRISTIAN SOCIAL ETHICS.—The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. Prerequisite: C.E. 27. 3 s.h. MR. SMITH

115. MORAL THEOLOGY IN THE TWENTIETH CENTURY.—Critical and comparative examination of ethical theory as exhibited in the work of William Temple and selected contemporary theologians. 3 s.h. MR. SMITH

190. THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 3 s.h. MR. LACY

194. THE PROTESTANT CHURCH AND AMERICAN CULTURE.—Analysis from the perspective of Christian ethics of current problems in the interpenetration of Church and culture with explicit reference to the parish setting. 3 s.h. MR. SMITH

292. CHRISTIANITY AND INTERNATIONAL RELATIONS.—An application of Christian Ethics to world problems. 3 s.h. MR. LACY

333. SEMINAR: MARXIST IDEOLOGY AND CHRISTIAN FAITH.—Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. Prerequisite: C. E. 190 or equivalent. 3 s.h. MR. LACY

389. CHRISTIAN ETHICS AND CONTEMPORARY CULTURE.—A study of the interaction between Christian thought and current secular social theory. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

390. CURRENT PROBLEMS IN CHRISTIAN ETHICAL THEORY.—A critical study, seminar style, of dominant issues in Christian Ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community and vocation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

391. HISTORICAL TYPES OF CHRISTIAN ETHICS I.—A critical study of representative statements of Christian ethical theory, through the early Reformation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. MR. BEACH

392. HISTORICAL TYPES OF CHRISTIAN ETHICS II.—A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 s.h. MR. BEACH

393. THE CHRISTIAN INTERPRETATION OF HISTORY.—A comparative examination of the chief secular and Christian theories of history current in Western thought. For advanced students. Prerequisite: C.E. 27. 3 s.h. MR. BEACH

394. CHRISTIANITY AND THE STATE.—The relation of the Christian theory of the State to political problems with special consideration of the religious assumptions underlying democratic theory and practice, and of the relationship of Church to State. Prerequisite: C.E. 27. 3 s.h. MR. BEACH

# *IV. Professional Studies*

## THE CARE OF THE PARISH

10. THE CHURCH AND THE MINISTER'S VOCATION.—An orientation course for beginning students, devoted to a consideration of the nature of the Church and the tasks of the ministry. 1 s.h. MR. SMITH AND OTHERS

23. THE CARE OF THE PARISH.—A consideration of the pastor's function as leader of the Christian community. 3 s.h. MR. INGRAM AND OTHERS

146. CHURCH BUILDING.—The role of the pastor in planning and executing building programs in the local church: architectural considerations and counsel, building requirements and plans. 2 s.h. MR. NESBITT

148. CHRISTIAN STEWARDSHIP AND CHURCH FINANCE.—A seminar to consider the principles of stewardship education, budget making, enlistment in church support. 2 s.h. MR. INGRAM AND MR. KALE

149. THE MINISTRY TO THE CAMPUS.—An examination of the circumstances which have produced, and the unique problems which confront, the ministry on the campus, considered from the perspective of the Christian idea of higher education. 3 s.h. STAFF

150. RURAL CHURCH AND COMMUNITY.—The church serving the rural community, factors affecting church and community life, qualifications and task of rural leadership, and the church as a community institution. 2 s.h. MR. NESBITT

151. TOWN AND COUNTRY MINISTRY.—The small church, the circuit church, circuit administration, larger parish and group ministry, and the Town and Country movement. 2 s.h. MR. NESBITT

152. EVANGELISM AND THE LOCAL CHURCH.—A study of the nature, purposes and methods of contemporary Christian evangelism with special attention to the local church. 2 s.h. MR. KALE AND MR. INGRAM

153. PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 2 s.h. MR. INGRAM

154. THE URBAN CHURCH.—The function, nature, program, and administration of the effective city church and of the urban minister's distinctive task. 2 s.h. MR. INGRAM

155a. THE POLITY OF THE METHODIST CHURCH.—The history and present structure of the organization of The Methodist Church. 2 s.h. MR. INGRAM

155b. THE POLITY OF THE BAPTIST CHURCHES.

155c. THE POLITY OF THE CONGREGATIONAL-CHRISTIAN CHURCHES.

155d. THE POLITY OF THE PRESBYTERIAN CHURCHES. STAFF

FIELD WORK PRACTICUM I.—Discussion of various aspects of parish work with opportunity for students to seek guidance respecting procedures and problems. Designed especially for students with parish responsibilities. (Fall Semester. Sections arranged.) 1 s.h. MR. KALE AND OTHERS

FIELD WORK PRACTICUM II.—Required of students expecting summer assignments under the Endowment and Field Work Program. Types of parish service to be discussed. (Spring Semester) 1 s.h. MR. NESBITT AND OTHERS

## CHRISTIAN EDUCATION

22. THEOLOGY AND CHRISTIAN NURTURE.—The implications of theology and educational philosophy for the theory and practice of Christian education. 3 s.h. MR. RICHEY

25. THE CHURCH AND CHRISTIAN NURTURE.—A constructive survey of the local church as a community of Christian nurture: Statement and evaluation of objectives, leadership and resource materials, structural patterns and administrative and supervisory procedures for the church school. 2 s.h. MR. KALE

125. THEOLOGICAL AND PSYCHOLOGICAL INTERPRETATIONS OF MAN.— (See C.T. 125)

126. MISSIONARY EDUCATION IN THE LOCAL CHURCH.—Practical programs for church school, audio-visual aids, preaching, stewardship, and special projects. 2 s.h. MR. LACY AND OTHERS

129. RELIGION AND PERSONALITY.—Investigation of religious aspects of the origins, structure, and development of selfhood. 3 s.h. MR. RICHEY

161. TEACHING METHODS.—Basic teaching procedures required by professional and lay workers in the local church. Opportunities are arranged for observation and guided practice in church schools, and/or other institutions. Required for candidates for the M.R.E. degree. 3 s.h. MR. KALE

162. CURRICULUM BUILDING IN THE LOCAL CHURCH.—An examination of influential theories of and contemporary trends in curriculum construction, together with an evaluation of existing curricula. Actual designing of short units for use in the local church. 3 s.h. MR. KALE

164. CHRISTIAN EDUCATION OF CHILDREN.—The organization and administration of the work of the church with children of the nursery, kindergarten, primary and junior age groups. 2 s.h. MR. KALE

165. CHRISTIAN EDUCATION OF YOUTH.—The organization and administration of the youth program in the local church. 2 s.h. MR. KALE

166. CHRISTIAN EDUCATION OF ADULTS.—A study of the needs of adults; the materials, methods, and principles of organization for the Christian education of adults. 2 s.h. MR. KALE

167. THEOLOGY AND THE LAITY.—A study of contemporary lay movements and centers, the ministry and mission of the laity in Church and world, and the ministry of teaching in the lay renewal of the Church. (For Middlers and Seniors.) 3 s.h. MR. RICHEY

169. THEORIES OF CHRISTIAN EDUCATION.—A critical investigation of current theories of Christian education. 2 s.h. MR. RICHEY

CHRISTIAN EDUCATION PRACTICUM.—Required of M.R.E. candidates. One class per week and supervised project. 3 s.h. MR. KALE AND OTHERS

## PASTORAL CARE

26. INTRODUCTION TO PASTORAL CARE.—The psychology of personal adjustment and pastoral care. An approach to pastoral care and its place in the pastor's total ministry grounded in an understanding of the dynamics of personal adjustment. 3 s.h. MR. GOODLING AND MR. SMITH

170. INTRODUCTION TO PASTORAL COUNSELING.—The philosophy and techniques of formal counseling through discussions of textual and interview material. Prerequisite: P.C. 26. 3 s.h. MR. GOODLING

171. PASTORAL CARE PRACTICUM I.—Pastoral Calls and Personal Counseling. A study of pastoral calling and personal counseling in the parish ministry. Prerequisites: P.C. 26 and 170. 2 s.h. MR. SMITH

172. PASTORAL CARE PRACTICUM II.—Marriage and the Family. A consideration of pre-marital and marital counseling and the psychodynamics of family life. Prerequisites: P.C. 26 and 170. 2 s.h. MR. GOODLING

173. PASTORAL CARE PRACTICUM III.—The Chaplain in a Rehabilitation Program. The ministry to those in alcoholic and correctional institutions. Prerequisites: P.C. 26 and 170. 2 s.h. STAFF

174. THE CHURCH AND MENTAL HEALTH.—The meaning of the self and the resources of the church in doctrine and worship in self-fulfillment. 2 s.h. MR. SMITH

175. ADVANCED PASTORAL CARE PRACTICUM.—For advanced students who want additional clinical experience in one of the Pastoral Care Practicum areas. Consent of the instructor is required. Students may register for from 1 to 5 s.h. clinic credit. STAFF

176. PASTORAL CARE PRACTICUM IV.—The Psychiatric Setting. Lectures by staff and ward visits at the Dorothea Dix Hospital in Raleigh. The place of the minister in a program dealing with the causes, treatment, and prevention of mental illness. Prerequisites: P.C. 26 and 170. 3 s.h. MR. STEININGER

177. PASTORAL CARE PRACTICUM V.—The Hospital Ministry. Pastoral care and counseling with the ill, the dying, bereaved. Prerequisites: P.C. 26 and 170. 2 s.h. and 1 s.h. clinic. MR. GOODLING

188. SCIENCE, FAITH AND PSYCHOANALYSIS.—An analysis of the fundamental categories of the Christian message and psychoanalysis. An exploration into the objectives and the methods of science and the meaning of religion. 3 s.h. MR. SMITH AND OTHERS

271. CLINICAL PASTORAL TRAINING I.—Out-Patient Counseling under psychiatric supervision. 4 s.h. STAFF

273. CLINICAL PASTORAL TRAINING II.—The Chaplain in a Rehabilitation program. Twenty hours of supervised clinical training weekly in a rehabilitation institution. 4 s.h. STAFF

276. CLINICAL PASTORAL TRAINING III.—The Chaplain in a Psychiatric Setting: the mental hospital.

276A. Full-time 12-week summer quarter. 6 s.h.

276B. Twenty hours per week fall semester. 4 s.h.

276C. Twenty hours per week spring semester. 4 s.h. STAFF

277. CLINICAL PASTORAL TRAINING IV.—The Chaplain in the General Hospital setting.

277A. Full-time 12-week summer quarter. 6 s.h.

277B. Twenty hours per week fall semester. 4 s.h.

277C. Twenty hours per week spring semester. 4 s.h. STAFF

## THE CHURCH AT WORSHIP

34. WORKSHOP IN COMMUNICATION.—Intensive drill in voice, diction, speaking and reading. Enrollment by recommendation of teaching faculty. 1 s.h. MR. RUDIN

## PREACHING

29-30. SERMON CONSTRUCTION—THEORY AND PRACTICE.—An investigation of the theory of preaching (first semester). Detailed work in practice preaching and a clinical session each week on the application of theory (second semester). 3 s.h. MR. HALL AND OTHERS

31. ADVANCED SERMON PRACTICE.—A weekly session of clinical exercises in expository preaching and sermon evaluation for senior students of Vocational Group I. Prerequisite: Pr. 29-30. 1 s.h. STAFF

181. PRACTICAL PROBLEMS IN PREACHING.—Analysis of selected sermons and discussion of problems facing the preacher in the pulpit. Prerequisite: Pr. 29. 2 s.h. MR. CLELAND AND MR. HALL

183. EXPOSITORY PREACHING—OLD TESTAMENT.—The exegesis and exposition of selected Old Testament passages for homiletical purposes. Prerequisite: Pr. 29. 2 s.h. MR. CLELAND

184. EXPOSITORY PREACHING—THE PAULINE EPISTLES.—A study for homiletical purposes of the religious experience and theology of Saint Paul and its influence on ethical theory and practice. Prerequisite: Pr. 29. 3 s.h. MR. CLELAND

185. EXPOSITORY PREACHING—NON-BIBLICAL.—An evaluation of drama, poetry and fiction for homiletical purposes. Prerequisite: Pr. 29. 3 s.h. MR. CLELAND

187. PRE-REFORMATION PREACHING.—Sermons, handbooks, and other historical sources studied in relation to Biblical preaching and the liturgical church, the problem of popular ministry and the issues of Christian reform. Prerequisite: C.H. 13. 2 s.h. MR. PETRY

193. THEOLOGY AND PREACHING.—An examination of the relation of systematic theology and homiletical presentation in the sermons of major Christian leaders, past and present. 3 s.h. MR. HALL

## WORSHIP AND CHURCH MUSIC

40. THE CHURCH AT WORSHIP.—The structure of worship, the rites of the church, its music, and the conduct of worship in the context of the Christian year. 3 s.h. MESSRS. CLELAND, HANKS AND RUDIN

134. LITURGICAL READING.—Practice in reading the liturgical materials of the pastoral ministry: Scriptures, prayers, and the rites and seasonal services in the Methodist *Book of Worship*. 2 s.h. MR. RUDIN

141. THE CLASSIC AGE OF THE ENGLISH HYMN.—Eighteenth century development of the English hymn with special reference to Watts and the Wesleys, their precursors and successors. 2 s.h. MR. BAKER

178. CORPORATE WORSHIP.—The theory and practice of the common worship of the Church, using various manuals of worship. One hour to be arranged. 2 s.h. MR. RUDIN

180. CHURCH MUSIC.—A two-fold study including: (1) A survey of the great monuments of church music, (2) Musicianship, songleading and basic conducting; with an emphasis upon the use of the hymn tunes and other music in the Methodist hymnal. 3 s.h. MR. HANKS

CHAPEL CHOIR.—Students who successfully complete C.W. 40 or C.W. 180 before graduation may qualify for credit (to the limit of 2 s.h.) of ½ s.h. for each semester of effective participation in the Chapel Choir. Choir membership (granted by audition) affords opportunity for study of the history and background of church music, and practical consideration of it in the context of public worship.

# Student Expenses and Residential Arrangements

IT is proper that a student should select his school on the basis of educational opportunity. At the same time financial consideration will be of legitimate and often pressing concern. Each student will find the Committee on Scholarship and Financial Aid ready to counsel with him concerning the financing of his seminary course.

The Board of Trustees of Duke University determines the costs of attending the Divinity School and these are subject to change without notice.

## FEES AND COSTS

| *Items* | *Per Semester* |
|---|---|
| Tuition Fee | $262.50 |
| General Fee | 56.50 |
| Approximate cost of meals per semester (estimated) | 275.00 |
| Room per semester (double room) for men | 125.00 |
| Total | $719.00 |

The "General Fee" is in lieu of all special charges, and includes the following fees: Matriculation, Medical, Library, Damage, Commencement, and Diploma. Both the Tuition Fee and General Fee are due and payable not later than the day of registration for a particular semester.

Students matriculating in either semester at a date later than that prescribed in the catalogue shall pay to the Treasurer of the University a penalty of $5.00. After the day of registration no refund of the "General Fee" will be made except for involuntary withdrawal to enter the Armed Services.

Divinity School students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of $15.00 per year plus any Federal taxes that may be imposed. This fee is payable in the fall semester.

Students who are reported by the Treasurer's office as delinquent in their accounts will be debarred from credit in courses until cleared by the Treasurer's office. Transcripts will not be issued for delinquent students.

The total cost for a student to attend the Duke Divinity School varies according to individual tastes and requirements; however, ex-

perience indicates that a single student may expect to spend from $1800.00 up with the average approximately $2050.00 and a married couple may expect to spend from $3500.00 up.

## AUDITING OF COURSES

Persons seeking to audit Divinity School courses must, with the consent of the instructor concerned, secure permission of the Dean's office. In accordance with general University practice a fee of $15.00 per course will be required of all auditors who are not enrolled students.

A description of dining facilities and living quarters is given in the *Bulletin of the Divinity School.*

# Financial Aid

The primary purpose of a financial aid program is to provide assistance, within limits, to students who demonstrate financial need. Financial need is defined as the difference between the total cost of attending a particular institution and the amount of resources available to the student. Financial assistance may consist of scholarships, loans, tuition grants, grants-in-aid, and employment, which may be worked out in various combinations.

Financial assistance is granted on the basis of need on a year-to-year basis, with reapplication and review each year.

Students are expected to be able to finance themselves for the first semester of work in the Divinity School. Those who show that they can carry their school work satisfactorily and who demonstrate need are then eligible to apply for various forms of financial assistance as described below under III and IV. Financial resources may be any or all of the following:

1. PERSONAL. In order that both the Church and the Divinity School may be able to extend the use of their limited funds to as many students as possible, a student who is desirous of a theological education should be willing to provide insofar as possible for the cost of such education from his own resources. These may be savings and earnings, gifts from family and friends, and, if married, earnings of spouse and gifts from parents of spouse. In calculating anticipated income, the student first considers his own resources.

II. CHURCH. Many local churches and conferences provide gifts and grants for theological education. Often the student makes direct application for these funds.

In recent years many Methodist Annual Conferences have established Ministerial Training Funds for the purpose of providing "service loans" to theological students to help defray the costs of tuition, fees, and other academic requirements. The service loans are repaid in "years of service" rather than in cash. The student makes application to his own Annual Conference.

III. THE DIVINITY SCHOOL

A. Scholarships

1. National Methodist Scholarships: Two National Methodist Scholarships, having a cash value of $500 each, are made

available annually by the General Board of Education of the Methodist Church to two outstanding students in the first year class. Awards are granted by the General Board of Education upon the recommendation of the faculty. Students receiving these awards are required to participate in a two-weeks' expense paid travel seminar during which they visit and study all of the boards and agencies of the Methodist Church located in Nashville, Chicago, New York City, Washington, and Philadelphia.

2. Senior Honor Scholarships: Each year a limited number of Honor Scholarships are awarded to rising seniors who have achieved academic excellence and who give unusual promise of service in the pastoral ministry.

3. Foreign Student Scholarships: In cooperation with the Crusade Scholarship Committee of the Methodist Church and other authorized church agencies students are admitted to courses of study. Scholarships for such students are provided from the Lewis Clarence Kerner Scholarship Fund and from local Methodist churches and friends.

B. Tuition Grants: Tuition grants in varying amounts, commensurate with need, are available upon application to the Committee on Scholarship and Financial Aid. Entering students may apply at the time of making application for admission. Those whose applications are received prior to February 1 should receive notice of the Committee's action not later than February 20. Those whose applications are received after February 1 will be notified as rapidly as their cases can be reviewed.

Currently enrolled students who are eligible for consideration must apply in November or December prior to the academic year for which a tuition grant is requested.

All applicants should understand that tuition grants will vary in amount according to need and are subject to review either at the initiative of the student or that of the Committee on Scholarship and Financial Aid at the time of Fall matriculation.

C. Grants-in-Aid: A Grant-in-Aid is a monetary grant made available to a student who chooses to make participation in the Endowment and Field Work Program an integral part of his seminary education and who sincerely wishes to render a service in a local church or church institution. The student may, after having been accepted by the Divinity School as a

regularly enrolled student, apply to the Committee for the privilege of participating in the program.

The Grant-in Aid program includes the following:

1. Summer Assistant Pastors: Students may apply during the fall semester (November) requesting approval to participate in the Summer Endowment and Field Work Program as Assistant Pastors. Upon request of churches, students are assigned to serve 10 weeks (or five, by special agreement) and in return they receive their room and board for the period of service and grants-in-aid up to $800. Married students whose wives work must be prepared to go without their wives. A limited number of entering students can be assigned; however, prior consideration is given to rising Middler and Senior students. Students transferring to another seminary are not eligible for assignment the summer prior to transfer.

   Address correspondence to: Endowment and Field Work Committee, Box 4814, Duke Station, Durham, N.C.

2. Winter Assistant Pastors: Any student who is not serving as a student pastor, may be assigned to serve as a part-time assistant in a local church or related agency during the period of the regular academic year, September through May. Applications for such assignments must be made to the Endowment and Field Work Committee at least thirty days in advance of the opening of the autumn semester each year. Students assigned to these positions agree to engage in a specified number of hours of field service each week and in turn they receive grants-in-aid in varying amounts. Assistant pastors and those doing special work are expected to keep their daily travel as low as possible. (Note additional statement in Section on Field Work.)

3. Student Pastors: The Divinity School does not appoint pastors to churches but serves as the liaison agency between the church and the student. The Director of Field Work, or his representative, advises with students regarding opportunities for pastorates and in turn offers information and recommendations to church officials regarding students who are eligible to be assigned to pastorates. No student can serve as a student pastor without the written approval of the Director of Field Work. Salaries and other forms of support are arranged by church officials in keep-

ing with denominational policies and are reported to the Divinity School.

Student Pastors may be enrolled for not less than eight or more than 12 hours of academic work in any given semester. (See pages 35 and 63).

If the charge being served is located beyond 50 to 55 miles distance from the campus, the students are required to take a residence in Durham or vicinity during the academic work week, Monday 2 p.m. through Friday, 4 p.m. Correspondence concerning a student pastorate should be addressed to: Director of Field Work, Box 4353, Duke Station, Duham, N.C.

IV, Loans: Loan Funds held in trust by the University, as well as Methodist Student Loans and funds supplied by the Federal Government through the National Defense Education Act of 1958, are available to qualified students.

Loans generally mature after the borrowers have left the University. Loan interest on long term loans from University funds accrues at the rate of 1% from the date of each note. After a student has left the University permanently, the loans begin bearing interest at the rate of 3% per annum. The balance unpaid after five years bears interest at the rate of 6% per annum.

Loan applications must be submitted not later than July 1 preceding the academic year for which assistance is requested and must be approved by the Committee on Scholarship and Finance.

*Note:* Unless otherwise indicated all correspondence concerning financial aid should be directed to: Financial Aid Office, The Divinity School, Box 4814, Duke Station, Durham, N.C. All applications will be reviewed by and all financial aid approved by the Committee on Scholarships and Financial Aid.

V. Employment: There are a number of opportunities during the academic year for part-time non-church employment on the Duke Campus and in the City of Durham. Students or wives needing this type of employment must make their own arrangements with employers and must plan their work schedules so as not to be denied full participation in the educational and cultural opportunities of the Divinity School.

Students or wives desiring employment with the University should apply to the Director of Personnel, Duke Station, Durham, North Carolina. 01, Allen Bldg.

# Field Work

*Its Nature and Purpose.* Field work is conceived to have a two-fold nature. (1) It is a symbol of a mutual relationship between the seminary and the local church, and it is an effective way of declaring and implementing the purpose of the seminary to serve the church as well as the student. (2) It is a vital part of the total education of the theological student, assisting him in understanding the nature and task of the church and in testing his motivation and fitness for the vocation of the ministry.

More specifically it is the purpose of field work: (1) to assist the student in understanding the nature and task of the local church; (2) to study some of the practical problems involved in the care of the parish; (3) to afford an opportunity for the progressive development of the student's knowledge and ministerial skills through responsible participation in the life of the church; (4) to contribute leadership to churches in the region, especially those having need for part-time workers.

*Types of Field Work.* (1) Student pastors, appointed by conferences or other official agencies of a recognized denomination. A student must have the approval of the Director of Field Work, as the agent of the Dean, before accepting an appointment as a student pastor. (2) Winter assistant pastors, assigned by the Director of Field Work, in consultation with the pastor and/or other leaders of local churches, to serve during the academic year. (3) Other church-related positions, such as teaching church school classes, counseling youth groups, scouting and recreation. (4) Summer assistant pastors under the Endowment and Field Work Program. This is a program of ten weeks' service in Methodist rural charges of North Carolina, under the appointment and supervision of the Director of the Work of the Rural Church, in cooperation with district superintendents and pastors. All students serving in this program must secure credit for Practicum II and participate each year in the preparatory training sessions, planned by the Duke Endowment Student Association in collaboration with the Director of the Work of the Rural Church.

*Supervision.* The chief supervisors of the Duke field work program are the Director of Field Work and the Director of the Work of the Rural Church under the Duke Endowment. Associated with them are other members of the administrative and teaching staff of the

Divinity School, district superintendents and pastors, denominational executive secretaries and graduate students in religion.

Supervision is carried on through: (1) Practicum I, required in the first semester of service as a student pastor, and Practicum II, required of all students working in the Summer Endowment and Field Work Program; (2) Regular visits by supervisors to charges served by student pastors and assistant pastors, followed by student-supervisor conferences; (3) Seminars (one day) for supervisors; (4) Regular reports from all students and charges to the Endowment and Field Work Offices.

*The Time Element of Field Work.* (1) While the student pastor carries a reduced academic load (see page 35) his divinity studies provide his chief concern and occupation. The amount of time given to parish responsibilities is necessarily limited. (2) It is expected that students serving as assistants during the academic year will be limited ordinarily to 12 to 15 hours of field service per week. A more extensive responsibility beyond such a number of hours will require the student to reduce his academic load. (3) Students serving as church school teachers, youth counselors, and in similar positions are ordinarily expected to devote no more than 3 to 6 hours to this service per week.

# Scholarship Resources

Certain special funds have been established, the income from which is used to provide financial aid through scholarships and grants-in-aid for students wishing to secure training in preparation for the Christian ministry. The resources listed below include endowed funds and sources of annual contributions.

### R. Ernest Atkinson Legacy

In 1952, under the will of the Reverend R. Ernest Atkinson of Richmond, Virginia, a member of the Trinity College Class of 1917, a sum of money was given to the Divinity School, the income to be used for the benefit of the School.

### Mary Reynolds Babcock Foundation Scholarships

Through the generosity of the Mary Reynolds Babcock Foundation of Winston-Salem, North Carolina, a limited number of scholarships in an amount not exceeding $1,400 per year are granted to students in candidacy for the B.D. degree, on nomination and decision of the Dean and Committee on Scholarships and Financial Aid.

### E. M. Cole Fund

In 1920 Mr. Eugene M. Cole, a Methodist layman, of Charlotte, North Carolina, established the E. M. Cole Fund the proceeds from which are to be used in providing assistance for ministerial students.

### The Duke Endowment

Among the beneficiaries of The Duke Endowment are the rural Methodist Churches of the two North Carolina Conferences. Under the Maintenance and Operation Program grants-in-aid are available for Duke Divinity School students to serve as assistant pastors under the Endowment and Field Work Program.

### N. Edward Edgerton Fund

In 1939 Mr. N. Edward Edgerton of Raleigh, North Carolina, an alumnus of Duke University of the Class of 1921, a member of the Board of Trustees of the University, established the N. Edward Edgerton Fund. The award is limited to students who are candidates for the B.D. degree.

### THOMAS JEFFERSON FINCH SCHOLARSHIP

In 1955 Mr. George Davis Finch, '24, and Mr. Brown Faucette Finch, '54, established an annual scholarship in the amount of $650 a year in memory of Mr. Thomas Jefferson Finch, Trinity College Class of 1884, who was the father and grandfather of the donors.

### THE JAMES A. GRAY FUND

In 1947 Mr. James A. Gray of Winston-Salem, North Carolina, presented the fund, which bears his name, to the Divinity School for use in expanding and maintaining its educational services in behalf of North Carolina churches and pastors. From this fund three scholarships are awarded; two in city church work, and one in rural church work. The Divinity School Seminars and a number of scholarships in the School for Supply Pastors are also supported by income from this gift, as well as the James A. Gray Lectures.

### P. HUBER HANES SCHOLARSHIP

Mr. P. Huber Hanes of Winston-Salem, North Carolina, an alumnus of Duke University of the Class of 1900, has established for Duke University an annual scholarship fund, a portion of which is used to provide financial assistance for Divinity School students.

### GEORGE M. IVEY SCHOLARSHIP FUND

This fund was established December 8, 1948, by gift of George M. Ivey, of Charlotte, North Carolina, an alumnus of Duke University of the Class of 1920, the income to be used for scholarship aid for deserving students in the Divinity School.

### LEWIS CLARENCE KERNER SCHOLARSHIP

This scholarship fund was established May, 1959, by Beatrice Kerner Reavis, of Henderson, North Carolina, in memory of her brother, Lewis Clarence Kerner. The income from the principal of this fund is designated for the assistance of native or foreign-born students preparing for service in world Christian missions.

### LAURINBURG CHRISTIAN EDUCATION FUND

This fund was established December 11, 1948, by gift through the Methodist College Advance Fund, the income to be used for scholarship aid for worthy students of the Divinity School.

### MYERS PARK SCHOLARSHIP FUND

The Myers Park Scholarship Fund was established in 1948 by contributions of the members of the congregation of the Myers Park Methodist Church, Charlotte, North Carolina, the income to be used for the benefit of the Divinity School.

### W. R. Odell Scholarship

In 1946 the Forest Hills Methodist Church, Concord, North Carolina, established a scholarship fund in memory of W. R. Odell, for many years a member of the Board of Trustees of the University.

### Jesse M. Ormond Scholarship Fund

In 1948 the North Carolina Conference established a fund in honor of Professor Jesse M. Ormond, who for many years was Director of Field Work in the Divinity School and Professor of Practical Theology.

### Gilbert T. Rowe Memorial Scholarship Fund

The Gilbert T. Rowe Memorial Scholarship Fund was established through the generosity of Divinity School Alumni and friends of the late Gilbert T. Rowe. The interest on this fund is employed annually for a limited number of senior honor scholarships. Rising senior students with exceptional records and promise of usefulness in the Christian ministry are eligible for grants under this scholarship program.

### Elbert Russell Scholarship

In 1942 the Alumni Association of the Divinity School established a scholarship fund in honor of Elbert Russell, late Dean of the Divinity School and for a number of years Professor of Biblical Theology.

### Hersey E. Spence Scholarship

In 1947 the Steele Street Methodist Church of Sanford, North Carolina, established a scholarship fund in honor of Professor Hersey E. Spence, a former pastor of the congregation, the income to be used for scholarship aid to deserving students of the Divinity School.

### The Methodist Church

The Methodist Church makes a substantial contribution to the Divinity School by designating a certain percentage of its World Service offerings to the school.

The North Carolina and the Western North Carolina Conferences direct a certain percentage of their College Sustaining Funds to the Divinity School. The South Carolina Conference is a contributor to the Divinity School operational income.

The General Board of Education makes available annually two National Methodist Scholarships having a cash value of $500 each. (See pages 58-59).

Local Methodist churches throughout the Southeast make contributions to the scholarship funds of the Divinity School, thus making

it possible to assign students under the Endowment and Field Work Program to urban and out-of-state churches.

### THE METHODIST COLLEGE ADVANCE

The Divinity School was a participant in the North Carolina Methodist College Advance with askings of $200,000 for scholarship aid and extension of the School's service to ministers. Many local churches and individuals have shared in the raising of this significant sum. Specific contributions are the Henry Harrison Jordan Loan Library, the James A. Gray Fund, the J. M. Ormond Fund, the Laurinburg Christian Education Fund, the Hersey E. Spence Fund, and the Myers Park (Charlotte, North Carolina) Methodist Church Fund.

### DEMPSTER GRADUATE FELLOWSHIPS

The Methodist Board of Education offers each year the Dempster Graduate Fellowships for graduates of Methodist Theological Schools, who are engaged in programs of study leading to the degree of Doctor of Philosophy in Religion with a view to teaching in Methodist colleges and seminaries. Several Divinity School graduates have held these fellowships.

# SCHOOL OF FORESTRY

Fall semester begins September 19, 1964

Spring semester begins January 31, 1965

# Forestry in Duke University

DUKE UNIVERSITY, located at Durham, North Carolina, comprises Trinity College, the Woman's College, the College of Engineering, the Graduate School of Arts and Sciences, and the professional schools of Forestry, Divinity, Law, Medicine, and Nursing. The University dates from 1838, when Union Institute was founded in Randolph County by the Methodists and Friends. In 1851 the institution became Normal College, one of the first schools in America for the training of teachers. In 1859 the name was changed to Trinity College and so continued until 1924, when the College became a part of Duke University.

By virtue of an indenture of trust, executed December 11, 1924, by James Buchanan Duke, a great benefaction was placed at the disposal of humanity by providing for hospitalization, church work in rural communities, and education. The principal feature of the educational provision was the creation of Duke University.

The University, with a student body of over 6,400, occupies two campuses. The Woman's College campus of 108 acres was formerly the campus of Trinity College. About a mile west are the new units of the University, known as the West Campus, totaling 467 acres. It was first occupied in September, 1930.

Forestry in Duke University began early in 1931 when the Duke Forest was placed under intensive forest management and forestry research was initiated. An academic-forestry curriculum, designed for students intent upon pursuing the study of forestry as a profession, was organized in Trinity College of Duke University in 1932. This program was enlarged in 1956 and now includes more than 60 cooperating colleges and universities. (See pages 41-43.)

In 1938 the School of Forestry was organized at the graduate level and a curriculum was offered leading to the degree Master of Forestry. Work leading to the degree Doctor of Forestry has been offered since 1940. The School has been fully accredited since its origin. A degree in technical forestry at the undergraduate level is not offered at Duke University.

Graduates of recognized colleges and universities, and professional schools of forestry, and other men who meet the entrance requirements of the School (see page 13), may enroll for training in technical forestry leading to the professional degrees, Master of Forestry and Doctor of Forestry. The Graduate School of Arts and Sciences also

offers graduate work in certain aspects of forestry leading to the degrees Master of Arts and Doctor of Philosophy. This work is available to graduates of schools of forestry of recognized standing, and to college or university graduates holding a Bachelor's degree with their major work in appropriate subjects.

Students taking undergraduate work and who are planning to matriculate in the School for programs of study leading to degrees Master of Forestry or Doctor of Forestry should refer to the section in this announcement (page 18) where entrance requirements are presented.

## *Educational Facilities*

The School of Forestry is housed in the south wing of the Biological Sciences Building on the West Campus. The programs of the School provide for classroom, laboratory, and field instruction in the fundamental disciplines of forestry and wood technology. Specialized training may be elected in forest management, forestry business management, forest economics, silviculture, silvics, forest entomology, forest biometry, forest pathology, mensuration, forest soils, tree physiology, forest hydrology, forest climatology, wood anatomy, timber physics, chemistry of wood, harvesting and processing, and several other areas in forest products technology.

General and research laboratories are provided for routine and original studies in all of the subject matter fields. These laboratories are equipped with instruments and facilities for quantitative evaluation of biological materials and processes. Greenhouses immediately adjacent to the Biological Sciences Building and the nearby Duke Forest offer excellent facilities for biological investigations in controlled and natural environments. An IBM 7072 Digital Computer system (with supporting 1401 system), housed in the Physics Building, is available for processing research data.

Facilities of allied departments of the University are also available for advanced work in biochemistry, chemistry, economics, genetics, mathematics, plant anatomy, plant ecology, plant pathology, and plant physiology.

West Virginia Pulp and Paper Company has made available to Duke University a field headquarters for work in the forests of the South Atlantic Coastal Plain. This camp, located 18 miles northwest of Summerville, South Carolina, is used as a base for field instruction in timber harvesting, wood utilization, soils, silviculture, and forest management.

The School periodically sponsors conferences and symposia on industrial forest management and other technical and scientific sub-

jects. These offer the current viewpoints of many outstanding individuals in both forestry and in allied fields.

The University libraries, with nearly 1,600,000 volumes and about 3,000,000 manuscripts, provide exceptional resources and facilities for study and research by undergraduate and graduate students, and by visiting scholars. About 55,000 volumes are added annually, while 125 foreign and domestic newspapers and over 6,000 periodicals are received currently. Large collections of microfilms of rare books, newspapers, and periodicals are also available.

The Biology-Forestry library (80,338 volumes), Chemistry library (20,398), and Physics-Mathematics library (26,277) are housed for convenience of use in the buildings of these departments. The libraries of the Schools of Divinity (108,560), Law (129,838), Medicine (72,891) and of the College of Engineering (31,847) are also shelved in the buildings of these schools, all on the West Campus.

## *The Duke Forest*

The Duke Forest, of approximately 7,000 acres, is particularly well situated for field work. A five-minute walk from the campus will take one well into many parts of the area, while even the most distant portions can be reached by automobile in about twenty minutes.

Short-term research projects are conducted on the Forest by graduate students in forestry, botany, zoology, and other disciplines. More extensive problems are investigated by the faculty with student assistance, segments of which may be used by students for observation, analysis, and interpretation. Many of these studies serve admirably as instructional material. The Forest provides additional instructional material, as well as demonstrations on an operational scale, of advanced forest practices developed at Duke and elsewhere.

The Forest lies in Durham and Orange Counties near the eastern edge of the Piedmont Plateau. A cross-section of much of the woodlands in the upper coastal plain and lower Piedmont of the Southeast is represented on the Forest with its variety of topography, soil, forest conditions, and patterns of past land use. Elevations range from 280 to 760 feet The soils are derived from such diverse parent material as metamorphic rock of the Carolina slate formation, granite, Triassic sedimentary rock, and basic intrusives. Nearly one hundred tree species are represented. Some eighteen miles of improved woods roads make all parts of these woodlands readily accessible. It serves as an outdoor laboratory for instruction in forestry and allied fields, and as an experimental forest for research in problems of timber growing and in the sciences basic thereto. It is also used to demon-

strate methods of silviculture and forest management applicable to the region.

At few other places in America are there provisions for extensive field study and research in forestry literally at the door of a large university. This natural outdoor laboratory, so conveniently located and representative of the region, is a most valuable supplement to the instructional, laboratory, and library facilities of Duke University.

## *Forest Sciences Laboratory*

The establishment of the Forestry Sciences Laboratory research facility of the Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the School of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The research staff of the Laboratory is available for consultation, participates in seminars and may serve on graduate committees of students in the School of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

# Requirements for Admission to the School of Forestry

THE admission requirements of the School of Forestry for work toward the MASTER OF FORESTRY degree presuppose that an applicant is either:

1. A graduate of a professional school of forestry, or
2. A graduate of a college or university of high standing, but without prior professional training in forestry, or
3. A student who has successfully completed the pre-forestry curriculum of one of the colleges (listed on pages 41-43) cooperating with the School in the academic-forestry training program.

Each applicant must present a certified transcript of his academic record showing the courses he has taken, the number of credit hours he has earned and the grades received. The total number of quality

points* must be at least two and one-half times the total credit hours to meet the minimum scholastic standards required for admission to the School. An applicant also must have satisfactorily completed undergraduate work in minimum amount, as follows:

One year of biology, including at least one semester of botany; or one year of botany.

One year of chemistry.

One course each in physics and the principles of economics.

Mathematics, through college algebra and trigonometry.

It is urged that an applicant without professional training in forestry present additional credits in the above subjects and in one or more of the following disciplines: soils, geology, mineralogy, petrology, climatology, surveying, languages (particularly German and French), sociology, political science, philosophy, psychology, and zoology.

An applicant who is a graduate of a professional school of forestry will present a certified transcript of his scholastic record showing the attainment of a degree. Before registering for the first semester of residence, the students will be required to select the branch or branches of forestry in which they wish to concentrate the major part of their work and to prepare their proposed programs in conference with an appropriate faculty advisory committee. Ordinarily, graduates of a fully accredited school of forestry should be able to meet all requirements for the Master of Forestry degree in one full school year of resident study; others may require a longer period of residence.

Students must make application for admission in advance of the opening of the school year. Those students entering without acceptable courses in plane surveying, forest surveying, forest mensuration, and silvics must take the work in these subjects in the Summer Session, and are required to submit their applications prior to May 1. Students entering with advanced standing in these courses should make application before September 1. Application blanks will be sent upon request made to the Dean of the School of Forestry.

Admission to the School of Forestry for a program of study and research leading to the degree, DOCTOR OF FORESTRY, is granted to a student who has received the degree, Master of Forestry, or its equivalent, from a school of forestry of recognized standing, and who has achieved an average of three quality points per hour of credit in his previous graduate studies.

An applicant must file a formal application for admission together with transcripts of his undergraduate and graduate academic records.

* Grades for each hour of college are valued in quality points as follows: "A," 4 points; "B," 3 points; "C," 2 points; "D," 1 point; and "F," no points.

In his application he should clearly state the branch of forestry in which he desires to concentrate, and if possible, the specific research.

The Committee on Admissions of the School of Forestry, together with the prospective student's major advisor, will determine if the qualifications of the applicant meet entrance requirements.

GRADES. Grades in the School of Forestry are as follows: E (exceptional); G (good); S (satisfactory); F (failing) and I (incomplete). The instructor who gives an I for a course specifies the date by which the student must make up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, the statement, NO CREDIT, is made upon the student's permanent record.

# Requirements for the Degree of Master of Forestry



THE requirements for the degree of Master of Forestry (M.F.) are governed by the extent of the student's previous professional training. Normally, students who have earned the degree of Bachelor of Science in Forestry, or equivalent, from an accredited school of forestry may complete the requirements for the M.F. degree in one academic year. Students who have had no prior professional training in forestry are required to complete one summer session and two academic years of resident study. Graduate work of equivalent grade done in residence at other institutions may, with the approval of the Faculty, be accepted as credit toward the degree, but a minimum of one year of residence at Duke University is required.

The submission of a thesis for the M.F. degree usually is required. With the approval of the Faculty, an acceptable report on a special study may be submitted in lieu of a thesis, credit for which will not exceed three semester hours. Four copies of the thesis, typewritten and bound in accordance with regulations set forth by the Faculty, must be deposited with the Dean of the School of Forestry on or before May 15 of the academic year in which the student expects to obtain the M.F. degree.

No student may take less than fourteen nor more than eighteen semester hours of credit per semester without special permission of the Faculty.

## POST-PROFESSIONAL PROGRAM

Students with satisfactory undergraduate professional training qualify for advanced study and research in the various disciplines of forestry under this program. A specific study plan is developed for each student through consultation with a faculty advisory committee. For the student planning a managerial career in the general area of forest production or in forest products technology (and where the Master of Forestry is planned as a terminal degree), these study plans usually consist of courses and seminars with a major portion of the work concentrated in the areas of the student's interests. For the student with research interest, the study plan is oriented within the subject matter field of interest toward the furtherance of a research career, or toward preparing him for academic training beyond the master's level.

A number of senior-graduate courses offered in other depart- of the University are open to qualified students in the School of Forestry. One or more of these may be included in a student's study plan when deemed advisable by his advisory committee.

A minimum of thirty semester credit hours, in which the student must earn a grade of E or G in at least nine hours, are required for the degree, Master of Forestry, under this program. Normally, 15 hours of credit (including thesis) must be earned in the School of Forestry.

## POST-LIBERAL ARTS AND SCIENCES PROGRAM

A student who has had no prior professional training in the areas of specialization offered in the School of Forestry is required to begin his studies with a summer term of twelve weeks. Two full academic years of study in addition to the work of the Summer Session are required under this program for the attainment of the degree, Master of Forestry. Any student who does not earn a grade of E or G in at least nine hours of work in the first academic year will not be permitted to enter into the work of the second year.

### SUMMER SESSION

| | S.H. |
|---|---|
| Plane Surveying (C.E. 110) | 3 |
| Forest Surveying and Aerial Photo Interpretation (F. 150) | 3 |
| Silvics (F. 243) | 3 |
| Forest Mensuration (F. 151) | 3 |

### FIRST YEAR

| *Fall Semester* | S.H. | *Spring Semester* | S.H. |
|---|---|---|---|
| Forest-tree Physiology (F. 201) | 3 | Harvesting and Utilization | |
| Forest Entomology (F. 230) | 3 | of Forests (F. 212) | 3 |

| | | | |
|---|---|---|---|
| Dendrology (F. 241) | 3 | Harvesting and Forest Products Field Seminar (F. 218) | 1 |
| Forest Soils (F. 261) | 3 | Forest Pathology (F. 223) | 3 |
| Forest Economics (F. 270) | 3 | Forest Policy (F. 276) | 2 |
| Theory and Practice of Silviculture (F. 244) | 3 | Forest Biometry (F. 250) | 3 |
| | | Wood Anatomy (F. 290) | 3 |
| | | Forest Management (F. 281) | 3 |

SECOND YEAR

During the latter part of the second semester of the first year each student will be requested to designate the subject matter field (or fields) he wishes to pursue in the second year. Those who successfully complete the work of the first year will be assigned a faculty advisory committee who, in consultation with the student, will develop his study plan in a manner identical with that described under the Post-Professional Program (see page 15).

## FORESTRY BUSINESS MANAGEMENT PROGRAM

A specialized program is offered in the School of Forestry, in cooperation with the Department of Economics and Business Administration, to meet the long-standing demand for forestry personnel well grounded in the principles of economics and well versed in the managerial process. This program involves two years of work leading to the degree of Master of Forestry and is open to selected students who have already earned the bachelor's degree in forestry or its equivalent, and who have demonstrated leadership qualities indicative of potential administrative and executive capacity.

The essential requirements of the program are as follows:

1. A minimum of 30 semester hours in courses in economics and business administration or closely allied fields.
2. A minimum of 15 semester hours concentrated in the areas of forest economics, management, and statistics.
3. Serve in a paid managerial trainee position with a cooperating forest industry or business for a period embracing the included summer and fall semester of the second year.
4. Formulate an analysis of some phase of the managerial operation of the company with which the training period is spent.

The specific program of study, commensurate with the above minimum standards and the student's academic background, will be developed by the program advisory committee in consultation with the student. A sample of suggested courses included in such a program, and admission application forms are available from the Dean of the School of Forestry.

# Requirements for the Degree of Doctor of Forestry

THE degree Doctor of Forestry (D.F.) is a professional and research degree conferred on those students who have satisfactorily completed specified requirements of advanced study and research. Although course work is a necessary part of a student's program, the mere accumulation of course credits will not be sufficient for the attainment of this degree. The granting of the D.F. degree is based primarily upon the student's thorough knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Work toward the D.F. degree, consisting of advanced studies in a major and a minor field, is offered with majors in the following branches of forestry: forest economics, forest entomology, forest management, forest mensuration, forest pathology, forest soils, forest-tree physiology, silvics, silviculture, forest biometry, forest hydrology, forest climatology, wood anatomy, timber physics, wood chemistry, and forest utilization. A minor may also be elected in any of these branches of forestry or in other areas of specialized study in the University approved by the Graduate School of Arts and Sciences. Prospective students should correspond with the Dean of the School of Forestry on all matters pertaining to admission to the School.

PROGRAM OF STUDY: A committee consisting of five members of the Faculty will be appointed by the Dean to supervise the work of each student. This committee will consist of a major advisor and four other faculty members. The major advisor will serve as Committee Chairman.

The student, in consultation with the advisory committee, will prepare a proposed program of study and research. After acceptance by the Committee, it will be presented to the Faculty of the School of Forestry for final approval. If in the judgment of the Committee the student's prior training is inadequate, he may be required to remedy such deficiencies by taking certain undergraduate courses as prerequisites to continued graduate study, but which will carry no graduate credit.

The program will consist of courses, seminars, arranged work and research, approved for graduate credit by the faculty of the School of Forestry. Satisfactory completion of a minimum of 30 semester

hours of formalized academic work in which the student must attain a grade of E or G in at least 12 hours is required of all prospective candidates. Credit hour requirements for the major and minor fields are determined by the Committee. The student's program of study necessarily demands substantial concentration on courses in his major department. A minor, if elected, will consist of at least 12 semester hours, part or all of which may have been included in the program for the Master's degree. If a minor is not elected, a minimum of six semester hours in a single subject matter area outside the major field must be included in the program of study.

FOREIGN LANGUAGES: A reading knowledge of two foreign languages is required. Normally these will be French and German. Spanish or another foreign language may be substituted for either French or German when deemed advisable by the Committee. The foreign language examinations will be conducted by the appropriate language departments of Duke University. At least one of the language requirements must be met during or before the student's first regularly enrolled semester at Duke University. Students not able to comply with this regulation will be required to reduce their maximum allowable load in succeeding semesters by 3 semester hours until the first language requirement has been met. The second language requirement must be met before the student is permitted to take the comprehensive preliminary examination. Enrollment in non-credit language courses at Duke University will be considered a part of the student's maximum allowable load in any one semester.

LANGUAGE EXAMINATIONS: On Monday of the fall registration period and on the day before spring registration, reading, vocabulary, and grammar tests in French and German are offered (see the Calendar for hour and place). Any entering student who has not taken these tests may do so. On the basis of his scores the student will (1) be certified as meeting requirements in these languages, (2) be advised to present himself for the regular reading examinations at the first opportunity, or (3) be advised to enroll in the special reading courses.

READING EXAMINATIONS: At dates listed in the Calendar, reading examinations in French and German are offered. Reading examinations in other languages must be separately arranged.

Students requiring the reading examination at other times must pay a special fee of $5.00 prior to registering in the Graduate Office for the examination. Students who require re-examination at scheduled times will be charged $5.00 for each re-examination; if special times are necessary, the fee will be $10.00.

COMPREHENSIVE EXAMINATION: At least six months before

the student expects to receive the D.F. degree, and after he has completed most of his formal course work, he will be required to take a comprehensive examination. The examination will be written in subject areas specified by the Committee and may be followed by an oral examination given by the Committee. The decision as to whether the examination has been passed or failed is the responsibility of the Committee.

PRIVILEGE OF RE-EXAMINATION: Should the student fail the comprehensive examination, he may apply, with the consent of his supervisory committee and of the Dean of the School of Forestry, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the D.F. degree at Duke University.

Upon satisfactory completion of the comprehensive examination the student will be considered a candidate for the D.F. degree.

RESIDENCE REQUIREMENTS: The minimum period of study beyond the M.F. degree, or its equivalent, is two years of academic work of which at least two regular semesters must be spent in full-time study on the campus in Durham. Graduate work of a fragmentary nature taken over a period of several years will not meet this requirement. Course work of equal grade taken at another college or university of approved standing may, with approval of the Faculty of the School of Forestry, be accepted in partial fulfillment, but shall not exceed 15 semester hours of the total requirements. Such transfer of credit may not under any circumstances be used to reduce the two regular semesters of full-time study which must be spent at Duke University. Course work taken under the cooperative interchange-of-registration plan between the graduate schools of Duke University and the Consolidated University of North Carolina is considered the same as work taken on the campus in Durham.

A student who has successfully completed the 30 hours of required formalized study, met the language requirements, and passed the comprehensive examination, may, with the approval of his supervisory committee and the Dean of the School of Forestry, continue his research and complete his dissertation *in absentia*. Under this arrangement he is required to register for one hour of research credit each semester until the degree has been awarded.

A student who remains in residence after passing the preliminary examination must register for a minimum of three semester hours of research credit each semester unless his course-seminar registration is at least nine hours, in which case the 3-hour registration requirement is waived.

DISSERTATION: In addition to obtaining adequate training in the field of his specialty, the student must demonstrate his ability to plan and conduct sound, original research. Evidence of this accomplishment must be presented in the form of an acceptable dissertation embodying the results of original work, which is a definite contribution to knowledge. Course credit is not granted but students must register for dissertation research.

The subject of the dissertation must receive the approval of the Faculty, and the title must be filed with the Dean of the School of Forestry on or before October 15 of the academic year in which the candidate desires to take his final examination.

The dissertation will normally be submitted for acceptance within two calendar years after passing the preliminary examination. Should it not be submitted within four calendar years after the examination, the candidate may, with the approval of his committee, petition the Dean of the School of Forestry for an extension of one year.

If the dissertation is not submitted and accepted within five years after the examination, the candidate must pass a second preliminary examination. Following the second examination, the student's doctoral committee will determine possible additional requirements and set time limits within which the dissertation must be completed and accepted.

After the dissertation has been approved by the major advisor, and at least 10 days prior to the date set for the final examination, the candidate is required to deposit with the Dean of the School of Forestry the original and three typewritten and temporarily bound copies together with 10 copies of an abstract of the dissertation consisting of not more than 600 words. Following acceptance of the dissertation by the Committee, the student will deposit with the Dean of the School of Forestry on or before April 15 of the academic year in which the student expects to obtain the D.F. degree, the original unbound copy of the dissertation together with three carbon copies (also unbound) and 10 copies of the approved abstract. The first carbon copy will be deposited in the University Library, the major advisor will receive one copy, and the fourth copy will be returned to the student. The original copy will be sent to University Microfilms, Ann Arbor, Michigan, where it will be reproduced and published on microfilms. Later the original will be returned to Duke University where it will be bound and deposited in the University Library.

The basic requirements for preparing the dissertation are described in the *Manual of Style for Theses and Dissertations* which may be obtained from the Duke University Book Store, West Campus. Additional instructions concerning the microfilming, preparation of title page and the abstract should be obtained from the Dean's office.

At the time the final approved copies of the dissertation and the abstract are deposited with the Dean of the School of Forestry, the candidate must show evidence of having paid a fee of $25.00 to the Treasurer of the University to cover the costs of microfilming.

FINAL EXAMINATION: The final examination will be in defense of the candidate's dissertation and on related subject matter. It will be oral and will be conducted by the advisory committee. At least six months must elapse between the dates of the preliminary and the final examinations.

# Forestry in the Graduate School of Arts and Sciences

MAJOR and minor work is offered in several disciplines of forestry leading to the A.M. and Ph.D. degrees, which are administered by the Graduate School of Arts and Sciences. Work for these degrees may be pursued only in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest biometry, forest climatology, forest entomology, and forest economics. Students who have had specialized training in botany or soil science and in allied basic subjects, such as physics, chemistry, geology, and zoology, may pursue graduate study and research only in the specialized fields for which their previous work has qualified them. Students who do not have previous training in forestry will be required to complete a minimum of thirty semester hours of approved work in forestry as a preliminary requirement to advanced study for the A.M. and Ph.D. degrees.

Applicants for admission to the Graduate School must ordinarily have made not less than a "B" average in their undergraduate work, and must not have concentrated excessively in one field of study to the detriment of a rounded program. They should have met substantially the requirements for the A.B. or B.S. degree at Duke University.

In addition to fulfilling the usual requirements for admission, the applicant must satisfy the Director of Graduate Studies in Forestry as to his liberal arts training, as well as to his preliminary training in the field of forestry.

For detailed information concerning admission to the Graduate

School, and for regulations governing candidacy for the A.M. and Ph.D. degrees, language requirements, residence requirements, and other regulations concerning these degrees, the student should consult the *Bulletin* of the Graduate School of Arts and Sciences.

# Tuition, Fees, and Expenses

THE following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration and no student is admitted to classes until arrangements have been made with the Treasurer of the University for the settlement of fees.

## *General Fees*

| | |
|---|---|
| Tuition, per semester | $525.00 |
| General Fee, per semester | $ 72.50 |
| Spring field seminars | $ 10.00 |

Forestry students may obtain admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of an athletic fee of $15.00 per year plus any Federal taxes that may be imposed. This fee is payable in the fall semester.

TRANSCRIPTS: A student is entitled to one free transcript of his academic record. A charge of one dollar is made for each additional copy.

PAYMENTS TO FELLOWS AND SCHOLARS: Payments by the University of stipends to fellows and scholars are made in eight monthly installments, beginning October 20. Fellows and scholars are required to pay the regular tuition fee and such additional fees as are ordinarily required of all graduate students.

## *Living Accommodations*

The Men's Graduate Center is available to men of the graduate and professional schools. It contains bedroom facilities for four hundred men, complete with lounges, study rooms, recreational rooms, post office and dining hall. The rooms are equipped for two persons and the rental charge for a double room is $500.00 for the academic

year, or $250.00 for each occupant, or $125.00 for each occupant each semester.

Rooms are rented for the academic year, but for no period of less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedules.

Room reservations are made through the Housing Bureau only after official acceptance for admission to the University. A $25.00 room deposit is required of each applicant before a room reservation is made. The initial room deposit is effective during the student's residence in the University if attendance is continuous in regular academic years. This deposit will be refunded under the following conditions:

a. Within thirty days after the student has been graduated.
b. Upon withdrawal from the University, provided written notice is received in the Housing Bureau by August 1, for cancellation of a reservation for the fall semester; and not later than January 15, for cancellation of a reservation for the spring semester.
c. When the reasons requiring withdrawal are beyond the student's control.

No refund is made until the occupant has checked out of his room through the Housing Bureau and has settled all of his accounts with the Treasurer.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation in accordance with the plan that is published during the school year.

Any exchange of rooms must be arranged at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to charges for both rooms.

The authorities of the University do not assume responsibility for the persons selected as roommates. Each student is urged to select his roommate when the room is reserved.

Beds and mattresses (39" x 74"), tables, chairs, dressers, mirrors, and window shades are furnished by the University. The student supplies linens, blankets and pillows. Rugs, totaling not more than 54-square-feet, study lamps and curtains are permissible, and if desired, are furnished by the students.

Duke University Apartments are available to married graduate students. The rental rates per month have been set at $70 for an efficiency apartment, $80 for a one-bedroom apartment, and $90 for a two-bedroom apartment. For further information on apartments for

married students, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Duke University desires to provide for its students a residential environment conducive to academic achievement, the development of high ideals, and sound character. The institution asks and believes that each student will cooperate in achieving these aims by arranging his personal belongings in an orderly manner, by caring for the buildings and furniture as he would in his own home, and by observing a code based on gentlemanly behavior in an educational environment which demands respect for all residents. Regulations governing the occupancy of rooms will be supplied directly from the Housing Bureau when room reservations are made. Occupants are expected to abide by these regulations.

Firearms (including air rifles) may be brought into the residence halls only upon written permission and registration with the Dean of Men of Duke University.

## *Dining Service*

The dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room where full meals and a la carte items are served. The cost of the academic year ranges from $450.00 upward depending on the tastes of the individual.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 A.M. to 11:00 P.M. The prices in these dining rooms are the same as those on the West Campus.

It is hoped that present rates may be maintained. Charges, however, are necessarily dependent on costs of labor, food, and materials, and some adjustment may be necessary.

Due to the large number of those served in the dining halls, it is not possible to arrange special diets for individual students. Special diet for the sick is served in the infirmary.

## *Estimated Expenses for an Academic Year*

The necessary expenses of a graduate student are moderate. The University dormitories provide thoroughly comfortable and wholesome living conditions at a minimum cost, while all charges made by the University have been kept low. Incidental expenses naturally depend upon the tastes and habits of the individual. The following table summarizes college expenses for one year:

| | Low | Moderate | Liberal |
|---|---|---|---|
| Tuition | $1050.00 | $1050.00 | $1050.00 |
| General Fees | 145.00 | 145.00 | 145.00 |
| Room-rent | 250.00 | 250.00 | 300.00 |
| Board | 450.00 | 500.00 | 550.00 |
| Laundry | 25.00 | 35.00 | 45.00 |
| Books | 50.00 | 60.00 | 70.00 |
| Athletic Fee (optional) | 15.00 | 15.00 | 15.00 |
| Spring field seminars | 10.00 | 10.00 | 10.00 |
| | $1995.00 | $2065.00 | $2185.00 |

## *Medical Care*

Forestry students who pay at least ⅗ full tuition and fees for the semester or the term of the Summer Session during which illness occurs are eligible under the Student Health Program. They are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided for men at the Student Health Office in Duke Hospital.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, and elective surgery.

Forestry students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. The complete medical facilities of the Duke University Medical Center are available to all members of the University community.

## *Motor Vehicles*

Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 07 Allen Building within five days after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student must present the following documents: (1) state vehicle registration, (2) state operator's license, (3) evidence of automobile liability insurance as required by North Carolina law ($5,000 per person, $10,000 per accident for personal injuries; $5,000 for property damage).

All students owning motor vehicles and living in the Men's Graduate Center are required to pay an annual parking rental fee of $30.00.

## *Student Activities*

Forestry students new to Duke University are reminded that they are welcome to use such recreational facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, instrumental, drama, and religious groups.

Students are encouraged to maintain broad professional contacts by participation in the activities of the Society of American Foresters, the Forest Products Research Society, the national honorary scientific society of Sigma Xi, and other societies appropriate to their major field of study.

The social and business events of the Forestry Club provide opportunities for many pleasant extracurricular activities. An active organization of the wives of forestry students offers a regular schedule of social occasions of interest to this group.

## *Bureau of Testing and Guidance*

The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

## *Appointments Office*

Duke University maintains an active Appointments Office which has steadily been placing students in teaching, governmental and industrial positions. The services of this office are available without charge to graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use in securing employment a complete file containing their academic record and pertinent recommendations, should register in this office.

# Fellowships, Scholarships, and Assistantships

A NUMBER of fellowships, scholarships, and assistantships are allocated to the School of Forestry for the encouragement and financial assistance of men who offer promise of becoming leaders in the forestry profession. These are awarded to applicants of high character on the basis of scholastic ability as judged by previous educational performance, professional experience, personal references and the Graduate Record Examination.

Holders of the awards will pay tuition and such additional fees as are regularly required.

The awards are of three classes:

FELLOWSHIPS: From five to eight fellowships, with stipends ranging from $1500-$2500 per academic year. Each recipient must have previously completed work equivalent to that required at Duke University for a Master's degree with a major in forestry or in a discipline basic to forestry. He will devote his time to an approved program of study and research in any of the branches of forestry. He is expected to become a candidate for the degree of Doctor of Forestry or Doctor of Philosophy.

SCHOLARSHIPS: From fifteen to eighteen scholarships with stipends ranging from $1250-$2000 per academic year. Each recipient will normally devote his time to an approved program of study leading to the degree of Master of Forestry, or Master of Arts with a major in forestry.

GRADUATE ASSISTANTSHIPS: One to several graduate assistantships with variable stipends up to $3600, depending upon available funds and upon whether granted for the academic year only, or the academic year plus the summer. Each recipient will devote half-time to research or other work of the School of Forestry. He will be permitted to enroll for not more than 20 semester hours in an academic year in an approved program of study, or study and research, leading to a degree of Master of Forestry, Master of Arts, Doctor of Forestry, or Doctor of Philosophy.

Two $3200 research assistantships, one in Forest Pathology, one in Forest Entomology, sponsored by the Southern Forest Disease and Insect Research Council, are available to qualified candidates.

Three industry-sponsored stipends are also awarded annually to qualified scholars. These are: *The Koppers Company, Inc. Scholarship* of $1600.00; and *The Brunswick Pulp and Paper Company Fellowship for Research in Hardwood Silviculture* of $2000.00, and *The Lilly Company Scholarship of* $1600.00.

APPLICATION FOR AWARDS: Any student admitted to the School of Forestry is eligible to apply for a fellowship, a scholarship or an assistantship. Application for these awards may be made concurrently with the application for admission.

The general procedures and requirements for applying for any financial award in the School of Forestry are outlined below. Applicants should initiate the necessary action early to insure that the required documents are filed with the Dean of the School of Forestry on or before March 1 prior to enrollment.

1. File award application. Form will be supplied by the School of Forestry on request.
2. Furnish supporting documents as follows:
   a. Official transcripts of record of all previous college or university credits earned.
   b. Letters of reference from at least three persons familiar with the applicant's character, scholarship, and professional ability.

(Documents offered in support of admission, if so designated, may also serve in support of the application for financial award.)

3. Complete the Aptitude Test of the Graduate Record Examination. Instructions and application for admission to this locally administered examination are available on most college campuses. from the Duke School of Forestry, or by writing the Educational Testing Service, Princeton, New Jersey. Applicants should plan to take this examination in January or earlier.

Notification of awards is made on April 1. In case vacancies occur. completed applications received after March 1 will be considered at a later date.

In every instance where a graduate assistantship, scholarship, or fellowship for the next academic year is offered to an actual or prospective graduate student and accepted before April 15, the accepter may resign his appointment without prejudice prior to that date by notification in writing to the Dean. However, an acceptance given or left in force after April 15 obligates him not to accept another appointment without first obtaining formal release from the Dean of the School.

## *Student Loans*

Students who have completed at least one semester in residence and who have satisfactory academic and citizenship records are eligible to apply for student loans. Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958, are available to qualified students.

Loans from university funds generally mature after borrowers have left the University. Interest accrues on long-term loans from University funds at the rate of one percent per annum from the date of each note. After a student has left the University permanently, the loans begin accruing interest at the rate of three per cent per annum.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of these loan funds normally begins one year after the student terminates his education at the University. Interest accrues at the rate of three percent per annum commencing at the time of the first payment, with complete repayment scheduled within a ten-year period. Special benefits to those teaching in the public schools permit a portion of the loan to be cancelled depending upon the length of teaching service. Complete details regarding the student loan program may be obtained by writing directly to the Executive Secretary of the University Scholarship Committee.

The Student Loan Committee in approving loan applications selects those students who, from the standpoint of character, scholastic attainment, personality and degree of financial need, are deserving of this consideration. All applications for loans should be made to the Executive Secretary of the University Scholarship Committee.

# Courses and Subjects of Instruction

## SCHOOL OF FORESTRY COURSES

### IN THE SUMMER SESSION

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit, tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. *Three weeks, eight hours a day beginning June 10, 1964.* 3 s.h. (w) ASSISTANT PROFESSOR ARGES

150. FOREST SURVEYING AND AERIAL PHOTO INTERPRETATION.—Application of plane surveying to forest problems; practice in making boundary, topographic, and cover type surveys; details of land ownership and transfer, title search, and deed descriptions. One week will be spent in the study of the principles of aerial photogrammetry and photo interpretation, and may be taken separately for 1 hour of credit. Prerequisite: Civil Engineering 110, or equivalent. *Three weeks, eight hours a day, beginning July 1, 1964.* 3 s.h. (w) PROFESSOR CHAIKEN

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environment. *Three weeks, eight hours a day, beginning July 22, 1964.* 3 s.h. (w) ASSISTANT PROFESSOR WOODS

151. FOREST MENSURATION.—Field studies in methods of measuring content and growth of trees and forest stands; practice in timber estimating, log scaling, use of mensurational instruments, and collection of basic data. *Three weeks, eight hours a day, beginning August 12, 1964.* 3 s.h. (w) PROFESSOR OSBORNE

### REGULAR SESSION COURSES FOR SENIORS AND GRADUATES

201. FOREST-TREE PHYSIOLOGY.—The principal physiological processes of trees, including water relations, synthesis and use of foods, and growth phenomena. Prerequisites: Botany 1-2 or equivalent; one year of chemistry. 3 s.h. (fall). PROFESSOR KRAMER

212. HARVESTING AND UTILIZATION OF FORESTS.—Principles, procedures, and cost determinations in harvesting timber products with emphasis on managed forests in North America. Processing of wood as a raw material by important forest industries. 3 s.h. (spring). PROFESSOR WACKERMAN

216. LUMBER MANUFACTURE.—Methods of processing logs for sawn products with emphasis on the principles involved in obtaining maximum volume and quality yield for large and small mills; trends in lumber consumption by regions; use of waste for by-products; the development of new lumber products; and industry problems. Prerequisite: Forestry 212 or equivalent. 3 s.h. (spring). PROFESSOR WACKERMAN

218. HARVESTING AND FOREST PRODUCTS FIELD SEMINAR.—Field studies of the major regional forest products industries; observation and application of harvesting techniques. 1 s.h. (spring). ASSISTANT PROFESSOR WHITE

223. FOREST PATHOLOGY.—Principles of plant pathology with special emphasis on representative forest tree diseases; introduction to forest products pathology. Related field and laboratory studies of regional tree diseases and deterioration of wood products. Prerequisites: Botany 1-2, or equivalent. 3 s.h. (spring). ASSISTANT PROFESSOR STAMBAUGH

230. FOREST ENTOMOLOGY.—Principles of protecting forests from injurious insect infestations; characteristics and identification of insect-caused damage to

trees and wood products; identification, biology, and control of the more important tree-infesting insect species. 3 s.h. (fall). PROFESSOR ANDERSON

232. FOREST PRODUCTS ENTOMOLOGY.—Study of the characteristics and identification of various types of injury to wood products caused by insects and other wood-damaging animals; identification, biology, and control of wood-damaging animals. Prerequisite: Forestry 230 or equivalent. 2 s.h. (spring). PROFESSOR ANDERSON

241. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisites: one year of biology including botany. 3 s.h. (fall). PROFESSOR HARRAR AND ASSISTANT PROFESSOR WHITE

244. THEORY AND PRACTICE OF SILVICULTURE.—Principles governing establishment, treatment, and control of forest stands; natural and artifical methods of reproduction, intermediate cuttings, and cultural operations with emphasis on the principal forest types of temperate North America. Field practice in silvicultural operations and study of managed stands. Prerequisite: Forestry 243 or equivalent. 3 s.h. (fall). ASSISTANT PROFESSOR WOODS

248. FOREST REGENERATION.—Fundamentals and practices of regenerating forest stands. Genetic control through recently developed propagating techniques; seed handling in the field, and during preparation for use; techniques for large production tree nurseries: the use of heavy equipment, chemicals, and fire for site preparation and timber stand improvement; recent developments in direct seeding and planting. 3 s.h. (fall). ASSISTANT PROFESSOR WOODS

250. FOREST BIOMETRY.—Statistical methods essential to the collection, analysis, and interpretation of forest data; includes regression and correlation techniques, Chi-square tests of associations, and tests of significance; short-cut computational procedures. Special attention is devoted to the use of statistical techniques in forest administration and mensuration problems. 3 s.h. (spring). PROFESSOR OSBORNE

251. SAMPLING METHODS IN FORESTRY.—Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 s.h. (Not offered 1964-65). PROFESSOR OSBORNE

257. DESIGN OF FORESTRY EXPERIMENTS AND ANALYSIS OF DATA.—Role of experimental design in field and laboratory, and statistical analysis of data as aspects of the scientific method in forestry research. 5 s.h. (Not offered 1964-65). PROFESSOR OSBORNE

261. FOREST SOILS.—Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalent; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 s.h. (fall). ASSOCIATE PROFESSOR RALSTON

270. ECONOMICS OF FORESTRY.—Development of the principles of economics useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry basic and peculiar to forestry, with special attention to the time dimension of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 s.h. (fall). PROFESSOR YOHO

272. MARKETING FOREST PRODUCTS.—Methods of selling and distributing lumber, timber, and other important forest products in domestic and foreign trade; trade-association functions; regional competition for markets; and transportation problems. Prerequisites: Forestry 212 and 270 or equivalents. 2 s.h. (spring). PROFESSOR WACKERMAN

276. FORFST POLICY.—Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public

and private forestry organizations, and current policy issues in the light of economic and other criteria. Prerequisite: Forestry 270. 2 s.h. (spring). PROFESSOR YOHO

281. FOREST MANAGEMENT.—Principles of organizing forest properties for systematic management, use of data obtained in surveys and inventories; principles of forest regulation, including a study of normal and actual forests, rotations, cutting cycles, and methods of regulating the cut in even-aged and all-aged forests for sustained yield; introduction to the preparation of preliminary forest management plans. Prerequisites: Forestry 150, 151, or equivalents. 3 s.h. (spring). PROFESSOR CHAIKEN

283. FOREST PROTECTION.—Principles of forest protection; causes, character and effects of forest fires; principles of forest fire prevention, presuppression and suppression; fire control costs and fire plans; protection against domestic animals, wildlife, and atmospheric agencies. 2 s.h. (fall). PROFESSOR CHAIKEN

285. FOREST-GAME MANAGEMENT.—Principles of management for the sustained production of desirable game and fur animals on forest land; characteristics and biology of important species. 2 s.h. (spring). PROFESSOR ANDERSON

286. FOREST-RANGE MANAGEMENT.—Principles of livestock management by which sustained maximum use can be obtained from forest grazing lands. 2 s.h. (spring). PROFESSOR ANDERSON

290. WOOD ANATOMY.—Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Prerequisites: one year of biology including botany; Forestry 241 or equivalent. 3 s.h. (spring). ASSISTANT PROFESSOR SULLIVAN

291. WOOD-MOISTURE RELATIONS.—Physical principles underlying the response of wood to moisture and its removal; the concept of equilibrium moisture content. Principles and methods involved in drying lumber and other wood products as a step in preparing them for use. Prerequisites: Forestry 212, and 290 or equivalents. 2 s.h. (fall). PROFESSOR WACKERMAN

292. MICROTECHNIQUE OF WOODY TISSUE.—Preparation of wood for microscopic study including sectioning, staining, and mounting techniques; elementary photomicrography. Prerequisite: Forestry 290 or equivalent. 2 s.h. (fall). PROFESSOR HARRAR

293. WOOD PRESERVATION.—Principles, methods, and materials used in treating wood to increase its durability, service-life, and fire resistance. Prerequisites: Forestry 212 and 290, or equivalents. 2 s.h. (fall). PROFESSOR WACKERMAN

201A. TO 293A. SPECIAL STUDIES IN FORESTRY.—Work on the same level as the foregoing Senior-Graduate courses to meet the needs of individual students. Credit and hours to be arranged. THE STAFF

## FOR GRADUATES

301 (fall), 302 (spring). ADVANCED STUDIES IN FORESTRY.—Credits to be arranged. To meet individual needs of graduate students in the following branches of forestry:

A. SILVICS.—Prerequisites: Forestry 241, 243, and 244 or equivalents.
ASSISTANT PROFESSOR WOODS

B. FOREST SOILS.—Prerequisite: Forestry 261 or equivalent.
ASSOCIATE PROFESSOR RALSTON

C. SILVICULTURE.—Prerequisites: Forestry 244, 245, and 246 or equivalents.
ASSISTANT PROFESSOR WOODS

D. FOREST MANAGEMENT.—Prerequisite: Forestry 281 or equivalent.
PROFESSOR CHAIKEN

E. FOREST ECONOMICS.—Prerequisite: Forestry 270 or equivalent.
PROFESSOR YOHO

F. PROPERTIES OF WOOD.—Prerequisites: Forestry 241, and 290 or equivalents. PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

G. FOREST MENSURATION AND BIOMETRY.—Prerequisites: Forestry 250, and 352 or equivalents. PROFESSOR OSBORNE

H. FOREST ENTOMOLOGY.—Prerequisite: Forestry 230 or equivalent. PROFESSOR ANDERSON

I. FOREST UTILIZATION.—Prerequisite: Forestry 212 or equivalent. PROFESSOR WACKERMAN

J. DENDROLOGY.—Prerequisite: Forestry 241 or equivalent. PROFESSOR HARRAR

K. FOREST-TREE PHYSIOLOGY.—Prerequisites: Plant physiology, plant ecology, and silvics. PROFESSOR KRAMER

L. FOREST PATHOLOGY.—Prerequisites: Plant physiology and Forestry 223 or equivalents. ASSISTANT PROFESSOR STAMBAUGH

M. FOREST CLIMATOLOGY AND HYDROLOGY.—Prerequisites: Forestry 341, 342, or equivalents. ASSISTANT PROFESSOR KNOERR

312. COST AND QUALITY CONTROLS IN FOREST UTILIZATION.—Principles and methods of obtaining greatest efficiency of operations and maximum product value in harvesting and processing forest products; factors governing the relation of tree size to net stumpage values; and the application of these principles and methods in the solution of actual case problems. Prerequisites: Forestry 212 and 270 or equivalent. 3 s.h. (spring). PROFESSOR WACKERMAN

321. RESEARCH TECHNIQUES IN FOREST PATHOLOGY.—Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223, or equivalent. 3 s.h. (fall). ASSISTANT PROFESSOR STAMBAUGH

331. TOXICOLOGY OF INSECTICIDES.—Study of the physical, chemical and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisites: one course in entomology; organic chemistry is recommended. 3 s.h. (spring). PROFESSOR ANDERSON

332. ECOLOGY OF FOREST INSECTS.—Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). PROFESSOR ANDERSON

333. MORPHOLOGY AND TAXONOMY OF FOREST INSECTS.—Principles of insect structure, classification and nomenclature; laboratory work concentrated on the collection, preservation and identification of both the adult and immature stages of various forest insects. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). PROFESSOR ANDERSON

341. FOREST METEOROLOGY.—The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (fall). ASSISTANT PROFESSOR KNOERR

342. FOREST INFLUENCES.—The influence of forests and other vegetation on local climate, the hydrologic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (spring). ASSISTANT PROFESSOR KNOERR

344. MICROMETEOROLOGY.—Physics of the earth's surface environment with emphasis on plant and animal microclimate: budgets of mass, momentum and energy; vertical structure of wind, temperature, and water vapor in relation to exchange processes within the biosphere; local circulation and eddy diffusion. Principles in micrometeorological measurement. Prerequisites: Forestry 341; calculus desirable. 3 s.h. (spring). ASSISTANT PROFESSOR KNOERR

348. SEMINAR IN SILVICS.—Advanced topics in silvics are discussed and current research papers and reports are reviewed, analysed, and evaluated. Prerequisite: Forestry 244 or equivalent. 2 s.h. (spring). ASSISTANT PROFESSOR WOODS

352. ANALYSIS OF FOREST MEASUREMENTS.—Empirical equations and curve fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisite: Forestry 250 or Mathematics 233 or equivalents. 3 s.h. (spring). PROFESSOR OSBORNE

353. SAMPLING AND EXPERIMENTAL DESIGN IN FORESTRY.—Theory and application of selected sampling designs to forestry populations. Includes multi-stage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Math 234 (Sample Designs) and Math 244 (Design of Experiments). 3 s.h. (fall). PROFESSOR OSBORNE

357. (fall), 358. (spring). RESEARCH IN FORESTRY.—Credits to be arranged. Students who have had adequate training may do research under direction of members of the Faculty in the branches of forestry indicated under courses 301, 302 with the same prerequisites as thereunder noted; each branch to bear the same letter designation as under courses 301 and 302. STAFF

362. FOREST SOIL PHYSICS.—Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 s.h. (spring). Offered in alternate years with Forestry 366 (not offered 1964-65). ASSOCIATE PROFESSOR RALSTON

364. SOIL CLASSIFICATION AND MAPPING.—Classification of soils as natural bodies. Mapping of soils, land use classes and forest site classes; field study will be made of soils in either the coastal plain or mountains. Prerequisite: Forestry 261. 2 s.h. (spring). ASSOCIATE PROFESSOR RALSTON

366. FOREST SOIL FERTILITY.—The relationships of soil fertility factors in the growth of forest trees. Emphasis placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisite: Forestry 261; analytical chemistry is recommended. 3 s.h. (spring). Offered in alternate years with Forestry 362. ASSOCIATE PROFESSOR RALSTON

368. SOILS-SILVICULTURE-MANAGEMENT FIELD SEMINAR.—Approximately two weeks at spring camp studying soils, silviculture, and forest management in the coastal plain. Prerequisites: Forestry 244, 261, and 281 or equivalents. 2 s.h. (spring). PROFESSOR CHAIKEN, ASSOCIATE PROFESSOR RALSTON AND ASSISTANT PROFESSOR WOODS

378. SEMINAR IN FOREST ECONOMICS.—Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 s.h. (spring). PROFESSOR YOHO

379. ECONOMIC ANALYSIS IN FORESTRY.—A critical exploration of static and dynamic economic theory including procedures in activity analysis applicable to forestry problems of resource allocation and production combinations, production location and timing; cost structure and asset control; uncertainty and expectations. Special attention to problems in formulating economic projections and forecasts relevant to forestry. Prerequisite: Forestry 270 or consent of instructor. 3 s.h. (fall). PROFESSOR YOHO

386. SEMINAR IN FOREST MANAGEMENT.—Examination and analysis of techniques employed in the management of industrial and public forests, particularly in the South; discussion of problems of large scale intensive forest management. Prerequisites: Forestry 244, 281, and 379 or equivalents. 2 s.h. (spring). PROFESSOR CHAIKEN

394. WOOD FINISHES AND FINISHING.—Preparation of wood and wood surfaces for application of finish coatings; the physical and chemical properties of finishing materials; equipment and methods of application; overlays, decals, and printing; laboratory control and qualitative evaluation of finished surfaces; finishing characteristics of various species of wood. Prerequisites: Forestry 290, 397 or equivalents; 1 year of organic chemistry also desirable. 2 s.h. (spring).
ASSISTANT PROFESSOR SULLIVAN

395. BONDING OF WOOD.—Preparation of veneers and lumber for bonding; types and characteristics of modern adhesives used in the manufacture of plywood and laminates; cold and hot pressing procedures; use of electronic heating; bag molding techniques; manufacture and properties of transmuted wood; inspection and testing procedures. Prerequisite: Forestry 290 or equivalent. 3 s.h. (spring).
ASSISTANT PROFESSOR SULLIVAN

396. CHEMISTRY OF WOOD.—A study of the chemical constituents of wood including cellulose and its derivatives, lignin and the lignin-cellulose bond, the hemicelluloses, and extractives; hydrogenation and hydrolysis of wood; cell wall chemistry. Prerequisites: Forestry 290 or equivalent, one course in college physics; organic chemistry desirable. 2 s.h. (fall). ASSISTANT PROFESSOR SULLIVAN

397. TIMBER PHYSICS.—The physical properties of wood in relation to electricity, heat, light, moisture, and sound; the mechanical properties of wood; influence of site, growth, and anatomy upon strength and quality of wood; standard timber testing procedures. Prerequisites: Forestry 290 or equivalent; one course in college physics; mathematics through calculus desirable. 2 s.h. (fall).
ASSISTANT PROFESSOR SULLIVAN

398. TROPICAL WOODS.—A study of the properties of various groups of tropical woods with particular emphasis upon those used in marine construction, and for lumber, plywood and furniture. Prerequisite: Forestry 290 or equivalent. 2 s.h. (spring). PROFESSOR HARRAR

399. FOREST PRODUCTS SEMINAR.—Examination and discussion of new and recent developments in the field of forest products. Prerequisites: Forestry 270, 290, 291, 293, 395, 397 or equivalents. 1 s.h. (spring) STAFF

## OTHER RELATED COURSES

A student in the School of Forestry, may, with the approval of the faculty of the School of Forestry and the Director of Graduate studies of the department concerned, include any of the following courses offered in the Graduate School of Arts and Sciences for which he has had adequate preparation. The student is referred to the *Bulletin* of the Graduate School of Arts and Sciences for the complete descriptive content of each course.

### BOTANY

Professor Louis E. Anderson, Director of Graduate Studies

| | S.H. |
|---|---|
| 202. Genetics | 4 |
| 203. Plant Cytology | 4 |
| 204. Advanced Plant Anatomy | 4 |
| 221. Introductory Mycology | 4 |
| 240. Plant Evolution | 3 |
| 252. Plant Metabolism | 4 |
| 254. Plant-Water Relations | 3 |
| 255. Advanced Taxonomy | 4 |
| 256. Community Analysis and Classification | 3 |
| 257. Principles of Plant Distribution | 3 |
| 258. Physiology of Growth and Development | 4 |
| 259. Environmental Measurements | 3 |
| 305. Vegetation of North America | 3 |

## CHEMISTRY

Professor C. K. Bradsher, Director of Graduate Studies

| | S.H. |
|---|---|
| 206. Elements of Theoretical Chemistry | 4 |
| 215. Advanced Inorganic Chemistry | 3 |
| 216. Nuclear Chemistry | 2 |
| 233. Instrumental Analysis | 2 |
| 234. Chemical Instrumentation | 2 |
| 251. Qualitative Organic Analysis | 2 or 3 |
| 252. Advanced Organic Preparations | 2 |
| 261-262. Physical Chemistry | 8 |
| 303. Thermodynamics | 3 |
| 304. Physical Chemistry of Reactions | 3 |
| 341, 342. Advanced Organic Chemistry | 8 |
| 350. Organic Reactions | 2 |
| 352. Mechanisms of Organic Reactions | 1 |
| 360. Polymer Chemistry | 2 |

## CIVIL ENGINEERING

Professor E. I. Brown, Director of Graduate Studies

| | S.H. |
|---|---|
| CE 201. Theoretical and Applied Mechanics | 3 |
| CE 202. Advanced Mechanics of Materials and Experimental Stress Analysis | 3 |
| CE 231. Structural Theory and Analysis | 3 |
| CE 242. Hydraulic Engineering | 3 |

## ECONOMICS AND BUSINESS ADMINISTRATION

Professor J. J. Spengler, Director of Graduate Studies

| | S.H. |
|---|---|
| 201. Senior Seminar in Economics | 3 |
| 204. Advanced Money and Banking | 3 |
| 218. Business Cycles | 3 |
| 219. Economic Problems of Underdeveloped Areas | 3 |
| 231. Economic History of Europe | 3 |
| 233. State and Local Finance | 3 |
| 237-238. Statistical Methods | 6 |
| 249. Product Markets | 3 |
| 262. Trade Unionism and Collective Bargaining | 3 |
| 268. Competition and Monopoly | 3 |
| 273-274. Auditing, Theory and Practice | 6 |
| 275-276. Advanced Industrial Accounting and Management | 6 |
| 277. Income Tax Accounting | 3 |
| 278. Advanced Problems in Income Taxation | 3 |
| 279. Budgeting and Control | 3 |
| 287. Public Finance | 3 |
| 290. The Use of Quantitative Methods in Business | 3 |
| 291. Business Policy | 3 |
| 293. Economic Systems | 3 |
| 294. Economic Functions of the State | 3 |
| 295-296. Advanced Accounting Seminar—Theory and Practice | 6 |
| 301. Economic Analysis | 3 |
| 304-305. Seminar—Money and Banking | 6 |
| 307-308. Quantitative Analysis | 6 |
| 311-312. History of Political Economy | 6 |
| 313-314. Seminar—Economic Theory | 6 |
| 315. Seminar—Economic Systems | 3 |
| 316. Seminar—Economic Functions of the State | 3 |
| 317. Seminar—Demographic, Population, and Resource Problems | 3 |
| 319. Seminar—Theory and the Problems of Economic Growth and Change | 3 |
| 320. Seminar—Trade Cycles, Employment, and Income Theory | 3 |
| 321-322. Economic Workshop—Economic Development | 6 |
| 329. Federal Finance | 3 |
| 330. Seminar—Public Finance | 3 |
| 331. Seminar—Economic History | 3 |
| 340. National Income | 3 |
| 355. Seminar—Labor Economics | 3 |
| 358. Seminar—Labor Market and Related Analysis | 3 |
| 365. Seminar—International Economics | 3 |
| 366. Seminar—Problems in International Trade and Finance | 3 |

386. Seminar—Latin American Economic Problems ..... 3
388. Seminar—Industrial Organization ..... 3
389. Seminar—Industrial and Governmental Problems ..... 3
401. Seminar—British Commonwealth ..... 3

## ELECTRICAL ENGINEERING

Professor C. R. Vail, Director of Graduate Studies

| | S.H. |
|---|---|
| EE 201. Energy Systems ..... | 3 |

## MATHEMATICS

Associate Professor S. L. Warner, Director of Graduate Studies

| | S.H. |
|---|---|
| 211. Finite Mathematics ..... | 3 |
| 212. Mathematical Analysis ..... | 3 |
| 221. Digital Computer ..... | 3 |
| 222. Introduction to Numerical Analysis ..... | 3 |
| 233. Statistical Methods ..... | 3 |
| 234. Sampling Designs ..... | 3 |
| 244. Design of Experiments ..... | 3 |
| 283. Probability for Engineers ..... | 3 |
| 285. Applied Mathematical Methods I ..... | 3 |
| 286. Applied Mathematical Methods II ..... | 3 |
| 291-292. Theory of Functions ..... | 6 |
| 325-326. Real Variable ..... | 6 |

## MECHANICAL ENGINEERING

Professor J. N. MacDuff, Director of Graduate Studies

| | S.H. |
|---|---|
| ME 201. Theoretical and Applied Mechanics ..... | 3 |
| ME 202. Theoretical Thermodynamics ..... | 3 |
| ME 222. Analysis of Heat Transfer .. | 3 |

## PHILOSOPHY

Professor Barnard Peach, Director of Graduate Studies

| | S.H. |
|---|---|
| 241. Logic ..... | 3 |

## PHYSICS

Professor Lawrence Biedenharn, Director of Graduate Studies

| | S.H. |
|---|---|
| 201-202. Mechanics ..... | 6 |
| 213-214. Contemporary Physics ..... | 6 |
| 217-218. Advanced Physics Laboratory ..... | 2-6 |
| 303-304. Thermodynamics and Statistical Mechanics ..... | 6 |
| 340. Structure of Matter ..... | 3 |

## POLITICAL SCIENCE

Professor R. R. Wilson, Director of Graduate Studies

| | S.H. |
|---|---|
| 207. American Constitutional Law and Theory ..... | 3 |
| 241. Administrative Management .... | 3 |

## SOCIOLOGY

Associate Professor A. C. Kerchkoff, Director of Graduate Studies

| | S.H |
|---|---|
| 233. Rural Sociology | 3 |
| 246. Public Opinion and Propaganda | 3 |
| 248. Pressure Groups and Public Relations | 3 |

## ZOOLOGY

Associate Professor D. A. Livingstone, Director of Graduate Studies

| | S.H. |
|---|---|
| 203. Ecology | 4 |
| 222. Entomology | 4 |
| 238. Systematic Zoology | 4 |
| 245. Radiation Biology | 3 or 4 |
| 246. Molecular Biology | 3 or 4 |
| 249. Neural and Hormonal Mechanisms in Invertebrates | 4 |
| 271. Cellular Physiology | 4 |
| 274. Invertebrate Zoology | 4 |
| 276. Protozology | 4 |
| 278. Invertebrate embryology | 4 |

# Cooperative Plan of Study with Selected Colleges and Universities

SINCE its inception the Duke School of Forestry has had the cooperation of Trinity College (the men's undergraduate college of arts and sciences of Duke University) in preparing students for professional careers in forestry. Under the plan, a student devotes his first three years to a coordinated and carefully integrated program of study in the basic arts and sciences in Trinity College. The summer between his junior and senior year and the two following school years are spent in the School of Forestry. Upon the successful completion of this five-year course of study, a student will have earned the Bachelor of Science degree from Trinity College and the professional Master of Forestry degree from the Duke School of Forestry.

Based upon the experience and success of this cooperative program with Trinity College, the School of Forestry in 1952 initiated similar programs of collaboration with a selected group of colleges and universities located throughout the United States. These programs offer students the numerous advantages of a broad background in liberal arts and sciences as preparation for later professional training. A student intent upon following such a course of study should make application to one of the colleges listed on pages 41-43. Admission requirements and other information pertinent to matriculation may be obtained from each of these institutions. Not later than the end of the first semester of the third year in the college or university of his choice, the student may make formal application for admission to the Duke School of Forestry. To qualify for admission under these programs, a student must have followed a planned course of study arranged in consultation with his advisor, must have the official recommendation of his college, and must meet the minimum requirements for admission to the Duke School of Forestry. A list appears in the *Bulletin of the School of Forestry*.

# THE GRADUATE SCHOOL OF ARTS AND SCIENCES

Fall semester begins September 24, 1964

Spring semester begins February 4, 1965

# General Regulations Governing Graduate Study

## *Admission*

PREREQUISITES. A student seeking admission to the Graduate School of Arts and Sciences of Duke University must have received an A.B. or B.S. degree (or the equivalent in the case of foreign students) from an accredited institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study. Normally he should have majored in the area of his intended graduate study. Many departments (see Courses of Instruction, pp. 59 ff.) list specific prerequisites. Students are urged to anticipate at least one of the language requirements (see pp. 25-27).

STUDENTS REQUIRING ADMISSION. Admission is required of 1) all students who intend to pursue study toward a degree offered by the Graduate School, 2) all other students who desire credit for whatever purpose for graduate courses—except students who register as Special Students in the Summer Session. Students who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean to undertake a doctoral program.

PROCEDURE FOR ALL APPLICANTS. A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should fill out completely and return promptly. In addition he should provide the following supporting documents: (1) a transcript or transcripts of all his undergraduate and graduate work mailed directly by the registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; (4) scores on the Graduate Record Examination or Miller Analogies Test as indicated.

GRADUATE RECORD EXAMINATION AND MILLER ANALOGIES TEST. Scores on the Graduate Record Examination and the Miller Analogies Test are always welcomed and must be submitted if either has been taken or if the applicant requests a fellowship.

They may be requested of any applicant whose record is marginal. Departmental requirements are listed below (**required, *strongly recommended):

| | Graduate Record Examination | | |
|---|---|---|---|
| | Aptitude Test | Advanced Test | Miller Analogies Test |
| Anatomy | ** | | |
| Biochemistry | * | * | |
| Botany | * | * | |
| Chemistry | * | * | * |
| Civil Engineering | * | * | |
| Economics | ** | ** | * |
| Electrical Engineering | * | * | |
| English | ** | ** | * |
| Forestry | * | | |
| German | * | * | |
| History | * | * | |
| Mathematics | * | * | |
| Mechanical Engineering | * | * | |
| Philosophy | ** | * | **[1] |
| Physics | * | * | |
| Physiology | * | | |
| Political Science | * | * | |
| Psychology | ** | | ** |
| Religion | * | | * |
| Romance Languages | ** | ** | |
| Sociology | * | * | |
| Zoology | ** | ** | **[1] |

[1] Either GRE or MAT acceptable

(Information on times and places of Graduate Record Examinations can be provided at the applicant's college or by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.)

ADDITIONAL PROCEDURE FOR FOREIGN STUDENTS. Fully qualified students from outside the United States are welcomed in the Graduate School to take courses and in many instances to study toward a degree. In applying for admission the foreign student should, in addition to the information required of all students, submit with his application (1) if his native language is not English, a statement by a qualified official that the applicant can read, write, speak, and understand English well enough to pursue a program of graduate study, (2) a statement certified by a responsible person that his finances are sufficient to maintain him during his stay at Duke University, and (3) a statement by a qualified medical doctor describing

any emotional or physical illness the applicant has had during the previous five years.

All foreign students whose native language is not English will be examined during their first registration period for competence in the use of oral and written English. Until competence is determined, admission and arrangements for an award involving teaching must remain provisional. Students found to lack the necessary competence will be required to enroll in the non-credit course English for Foreign Students and to reduce their course or research program three units if necessary. Passing this examination or the course, if it is required, will not meet degree requirements for a foreign language. See page 27.

CLOSING DATES FOR APPLICATIONS. Because applications cannot be reviewed until all required supporting documents are filed, applications should be submitted at least two weeks before the closing dates listed below:

| | |
|---|---|
| Fall semester admission and award | February 15 |
| Fall semester, admission only | August 1 |
| Spring semester, admission only | January 1 |
| Summer Session,* First Term | May 9 |
| Summer Session,* Second Term | June 16 |

It is the applicant's responsibility to make certain that his application is completed and in order before the dates specified.

NOTIFICATION AND STATUS. When the application is approved, the student will receive a letter of admission and an acceptance form. The process of admission is not complete until the statement of acceptance has been returned.

Applicants who are admitted will be offered full admission, provisional admission, or non-degree admission. *Provisional admission* is offered to students who (1) appear to warrant admission but who do not fully comply with admission requirements, for a trial period of one semester or a minimum of 12 hours of course work, or (2) are admissible except that the application lacks a letter of recommendation, a supplementary transcript, required test scores, or some other required information. *Non-degree admission* is offered to students who (1) have no intention of taking an advanced degree at Duke University but wish to take courses for accreditation, for transfer to other institutions, or for other purposes, (2) do not fully meet admission requirements but wish to further their academic interests, and (3) who apply late and must register before the application can be fully considered. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and

* Students seeking admission to the Graduate School for study in the Summer Session should make application to the Dean of the Graduate School as well as to the Director of the Summer Session.

when upon review the student is granted full admission; graduate credit earned under *non-degree* status may not be applied toward an advanced degree at Duke University. Late applicants ((3) above) will be granted full admission if admission can be completed within two weeks of registration.

## *Registration*

WHO MUST REGISTER. (1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in *in absentia* status; (4) all students who wish merely to audit a course or courses.

REGISTRATION. After the applicant has received notification of his admission to the Graduate School and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the *Bulletin,* he first confers with the Director of Graduate Studies of his major department, who prepares and signs a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. *Former students* who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

LATE REGISTRATION. All students are expected to register or pre-register at the times stated in the *Bulletin.* Those registering late are subject to a *late registration fee of five dollars.*

CHANGE OF REGISTRATION. During the academic year within a period of *fourteen days* from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean.

## *Grades, Hours, and Credits*

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in

terms of course hours and credits. The term *residence* designates full-time study and research in close proximity to facilities provided for both as opposed to part-time study incidental to a full-time occupation. Here required *residence* of one year is defined as two successive academic semesters of not less than nine units registration each semester. Credit for courses and seminars, research, and residence, and corresponding tuition and fees are stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour.

## CREDITS EARNED OUTSIDE THIS GRADUATE SCHOOL

(1) *Graduate Credit Earned before the A.B. Degree Is Granted.* Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his A.B. or B.S. degree. However, an undergraduate student at Duke University who, at the beginning of his final semester, lacks no more than 9 semester hours of fulfilling the requirements for the A.B. or B.S. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to fifteen hours a week. Such graduate courses will be credited toward the A.M., M.S., M.Ed., or M.A.T. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of the final semester.

(2) *Transfer of Graduate Credits.* Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the student through his Director of Graduate Studies should file a request that his credits be reviewed and a decision made.

(3) *Graduate Credit for Courses Taken in the School of Law.* Upon the recommendation of the Director of Graduate Studies, and upon the approval of the Dean of the Graduate School, students in the social sciences may take certain courses in the School of Law for graduate credit. In some instances courses in the School of Law may be considered as fulfilling a student's requirements for a minor. To register for such courses, the student should present a letter from his Director of Graduate Studies to the Dean of the School of Law requesting permission to register for certain specified courses.

(4) *Reciprocal Agreement with the Consolidated University of North Carolina.* Under a plan of co-operation between the Consolidated University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the Consolidated University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees

regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the Consolidated University of North Carolina. Beginning in 1962 as an experiment, a similar arrangement is effective in the Summer Session. See the Summer Session Bulletin for terms of this arrangement.

GRADES. Grades in the Graduate School are as follows: *E, G, S, F,* and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, *for an acceptable reason,* at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of *F* is entered upon the student's record unless his appeal to the Dean for the grade *No Credit* is approved. The grade of *Z* indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of *F* in a major course normally occasions withdrawal from a degree program; a grade of *F* in a minor course occasions academic probation.

## WITHDRAWAL AND INTERRUPTION OF PROGRAM

*From a Course.* For permissible changes during the first thirty days after the registration date, see Change of Registration, page 21. If a course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F.* If a course is dropped after the thirty-day period, the status of the student at the time of withdrawal from the course will be determined and be indicated on the permanent record as *Withdrew Passing (W.P.) or Withdrew Failing (W.F.).*

*From the Graduate School.* The University reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the Graduate School, he should notify both the Director of Graduate Studies in his major department and the Dean of the Graduate School prior to the date of his expected withdrawal. (For refunds upon withdrawal, see below, p. 21.)

A student who fails a course or seminar in his major subject will normally be asked to withdraw not later than the end of the ensuing semester or term. Failure in a minor subject places the student on academic probation.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, leave with the Graduate Office a statement of the reason for interruption, mailing address, and expected date of return. If they are subject to registration *in absentia,* they should arrange for such registration before departure.

A foreign student who after successfully completing a minimum of one semester's graduate study must withdraw for the purpose of returning home before the completion of a graduate program may with the approval of his major department request the Dean to issue him a Certificate of Graduate Study.

## *Language Requirements*

Because a requirement for the A.M. degree is mastery of one acceptable foreign language, and for the Ph.D. is mastery of two, the prospective graduate student should attain mastery of at least one acceptable foreign language and preferably two before applying for admission. The facilities for graduate study are highly specialized and costly. The student who must lay them aside to acquire what he could have learned as an undergraduate is wasting his time.

To prevent delay in meeting this requirement, students whose programs call for mastery of French, Spanish, or German and who have studied the language must take the objective examination at their first registration period.

ACCEPTABLE LANGUAGES. The languages normally required are French, German, and Russian, but with the approval of the Dean of the Graduate School, a student may substitute for any one of these another language which has a definite relation to the candidate's program of work for the degree and for which an examination can be provided.

MEETING THE REQUIREMENT. Language requirements may be met in three ways—by transcript, by an objective examination taken upon first registration, by a reading examination.

1. BY TRANSCRIPT. Under the conditions stated below, a *candidate for the Ph.D.* may, with the permission of the Dean of the Graduate School and of the chairman of the program committee, meet one of his language requirements by filing a transcript or certification showing that he has passed a comparable examination elsewhere. The conditions are that the examining graduate school has substantially the same language requirements as this Graduate School, that the examination has been passed while the student was pursuing a Ph.D. program in the same field as his declared major at Duke University or that the

examination was required of all Ph.D. candidates regardless of field, and that the examination has been passed recently enough to indicate that the student retains command of the language.

2. BY OBJECTIVE EXAMINATION. On Monday of the fall registration period and on the day before spring registration, Reading, Vocabulary, and Grammar tests in French, German, and Spanish are offered (see the Calendar for hour and place). Any entering student engaging upon an A.M. or Ph.D. program who has not already taken these tests may take them. (He should seek prior assurance that Spanish is acceptable.) On the basis of his scores the student will (1) be certified as meeting requirements in these languages, (2) be advised to present himself for the regular reading examinations at the first opportunity, or (3) be advised to enroll in the special reading courses (see below).

3. BY READING EXAMINATION. At dates listed in the Calendar reading examinations in French, German, Spanish, and, when requested, Italian are offered. Reading examinations in other languages must be individually arranged.

   Students who require re-examination at scheduled times will be charged $5.00 for each re-examination; if special times are necessary, the fee will be $10.00. Examinations at special times cannot be offered in French and Spanish.

SPECIAL READING COURSES. Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time. Undergraduates may not enroll during the academic year and may, with permission of the Dean of the Graduate School, in the Summer Session only if total registration permits.

REQUIREMENTS FOR FOREIGN STUDENTS. Foreign students whose native language is not English are, during their first registration period, required to take a test for minimum competence in English (see p. 20). Such students, with the approval of the Director of Graduate Studies in their major department, may request permission of the Dean of the Graduate School to substitute English for *one* of the required foreign languages. If permission is granted, an additional reading test in English, like those in French and German, will be arranged.

# Degrees Offered

THE DEGREES OFFERED. The Graduate School of Arts and Sciences now offers the following degrees: Master of Arts (A.M.), Master of Science (M.S.), Master of Education (M.Ed.), Master of Arts in Teaching (M.A.T.), Master of Hospital Administration (M.H.A.), Doctor of Philosophy (Ph.D.), and the Doctor of Education (Ed.D.).

## *General Regulations Governing Master's Degrees*

RESIDENCE REQUIREMENTS. Candidates for all Master's degrees must spend, as a *minimum,* one full academic year, or its equivalent in Summer Session terms, in residence at Duke University. (See p. 23.) Those who wish to complete their degrees wholly in the Summer Session must be in residence for five terms. Often more time will prove necessary in either case, depending upon the nature of the student's research problem if a thesis is offered and upon the student himself.

A Master's degree *without thesis* requires a *minimum* of 30 units of graduate credit in course and seminar work properly distributed between major and minor fields.

A Master's degree *with thesis* requires a *minimum* of 30 units of graduate credit; not less than 24 units must be in course or seminar work properly distributed between major and minor fields. If after completion of the 30-unit requirement the candidate remains in residence, he must register for a minimum of 3 units per semester.

A Master's candidate who presents a thesis when not registered in residence will be charged 3 units of residence for the semester in which the thesis is presented. (See above p. 23 and for fees for completing the degree during the Summer Session see the Summer Session Bulletin.)

CANDIDACY FOR THE MASTER'S DEGREE. To be considered as a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T., M.H.A.), the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during his first period of residence, he must make passing grades on the first 12 units of graduate courses), (2) have made a grade of *G* or *E* on at least 3

units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T., of the supervisory committee).

TRANSFER OF GRADUATE CREDITS.

Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum of required registration at Duke University.

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 units of further undergraduate training or 6 units of required language courses on the undergraduate level. In no case will credit be allowed for extension or correspondence courses.

TIME LIMITS FOR COMPLETION OF MASTER'S DEGREES. The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree *within two calendar years* from the date of his first registration in the Graduate School. *Any candidate* must complete all requirements *within six calendar years* of his first registration.

THE THESIS. The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on his special research problem. Although a publishable document is not required, the thesis must be written in an acceptable style and should exhibit the student's competence in scholarly procedures. Requirements of form are set forth in the the Duke University *Manual of Style for Theses and Dissertations,* revised 1961, obtainable at the Duke University Book Store.

## *The Master of Arts*

PREREQUISITES. As prerequisites to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments require more than 12 semester hours, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in this Bulletin.

LANGUAGE REQUIREMENTS. The candidate for the A.M. degree must have a reading knowledge of at least one foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) For methods of satisfying language

requirements see p. 25. The language requirements must be satisfied before the Master's examination is taken.

MAJOR AND MINOR SUBJECT. In his graduate work the student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major subject. The student must take a minimum of 6 units in a minor subject or related fields which are approved by his major department. The remaining 6 units of the required 24 may be taken in either the major or minor department, or in another approved by the major department and by the Dean of the Graduate School. In addition he must present a thesis, which carries a credit of 6 units for which he must register. Thus, his earned credit for the degree totals a *minimum* of 30 units.

FILING THE THESIS TITLE. At least one month before presenting the thesis, that is on or *before March 1 for a June degree* or on or *before July 1 for a September degree,* the student must file with the Dean of the Graduate School, on the official form, the title of the thesis and declaration of intention to graduate. The title must have the approval of the Director of Graduate Studies in the major department, and of the thesis supervisor.

PREPARING THE THESIS. All basic requirements for preparing the thesis are described in the *Manual of Style for Theses and Dissertations,* revised 1961, obtained at the Duke University Book Store, West Campus. The quality of paper, form, and binding are prescribed in the *Manual.*

SUBMITTING THE THESIS. Four typewritten copies of the thesis bound in snap binders supplied by the Library must be submitted in approved form to the Dean of the Graduate School on or before May 1 for a June degree or August 1 for a September degree and three to five days before the scheduled date of the student's examination. The copies will then be distributed to the several members of the examining committee. Two copies for the Library will be bound by the Ruzicka Bindery, fee $5.00 a volume. The student will state whether or not he wishes more than two so bound.

THE EXAMINING COMMITTEE AND THE EXAMINATION. The instructor who directs the thesis appoints an examining committee composed of the supervisor of the thesis and two other members of the Graduate Faculty, one of whom must be from a department other than that of the major. If the student has been permitted to take related work within the major department, the third member may represent the minor field within the department. This committee is submitted for approval to the Dean of the Graduate School when the thesis is first presented.

The candidate appears before this committee for an examination which lasts for about one and one-half hours. The subject matter

covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies this fact by signing the title page of all copies of the thesis. The candidate then returns the original, the first carbon copy of the thesis, and any others he wishes bound by Ruzicka, to the Dean of the Graduate School, who deposits them in the University Library.

## *The Master of Science*

PREREQUISITES. The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours work in the major field.

FOREIGN LANGUAGE. There is no foreign language requirement for this degree.

MAJOR AND MINOR SUBJECTS. The work for the Master of Science degree is designed to provide a broad foundation in the fields of civil, electrical, and mechanical engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses: at least 12 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 6 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 6 of the 24-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of Engineering. In addition to the 24-unit course requirement, the student must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

REGULATIONS AND PROCEDURES. The regulations and procedures for the thesis and the provisions for examination and an examining committee are the same as those for the Master of Arts degree.

## *The Master of Education*

PREREQUISITES. Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

Before the degree is conferred the student must have had one year

of actual teaching experience, or have met certification requirements by supervised student teaching in an accredited school. Such supervised student teaching may be at either the undergraduate or the graduate level.

REQUIREMENTS FOR THE DEGREE. The Master of Education degree may be earned either with or without the presentation of a thesis.

*Without thesis:* The required work includes a departmental major (Administration, Counseling, Elementary Education, or Secondary Education) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. This examination shall be prepared and conducted by the instructors of the student's major as designated by the Director of Graduate Studies of the Department of Education. Request to take this examination should be made to the Director of Graduate Studies at least two weeks before the date on which the examination is to be conducted.

*With thesis:* Students who elect this plan are permitted to substitute a thesis for 6 units for the required course work. The thesis subject must be approved by the instructor who is to direct it, and by the Director of Graduate Studies.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside of the Department of Education. The remaining 6 units are elective within the area of Education and the minor field, but require the approval of the student's major advisor and the Director of Graduate Studies.

The regulations governing the thesis are the same as those for the Master of Arts degree.

## *The Master of Arts in Teaching*

PREREQUISITES. The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. Should a student wish to undertake a graduate major different from his undergraduate major,

the prerequisites may be modified upon the recommendation of the student's committee and the approval of the Dean of the Graduate School.

PROGRAMS FOR THE DEGREE. Either of two programs may be arranged, in consultation with the student's committee:

A. A major in Education of 18 to 24 units and 6 to 12 units in non-education courses (for students seeking certification).

B. A major in non-education courses of 18 to 24 units and 6 to 12 units in Education (for students already certified).

In both programs a *minimum* of 30 units is required.

The non-education courses are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student. A major in Biological Sciences or in Physical Sciences is possible in this program.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations governing the thesis are the same as those for the A.M. Candidates for the Master of Arts in Teaching who have not had teaching experience are required to take Education 215-216 in which case a minimum of 36 units is required.

THE COMMITTEE. Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in the major department or area. This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another department. The chairman of the committee will normally be chosen from the department of the major.

RECOMMENDATION FOR TEACHER CERTIFICATION. Elementary School teachers who already hold certificates and who desire the recommendation of Duke University for a graduate teaching certificate must include in their Master's program a minimum of 12 semester hours in subjects ordinarily taught in elementary school and 12 semester hours in courses in education designed to improve them as elementary school teachers.

Secondary school teachers who already hold certificates and desire the recommendation of Duke University for graduate teaching certificates must include in their Master's program a minimum of 18 semester hours in their teaching fields and 6 semester hours in courses in education designed to improve them as secondary school teachers.

## *The Master of Hospital Administration*

PREREQUISITES. The Master of Hospital Administration degree is designed for persons intending to pursue a career of management in hospitals and other health agencies.

No specific undergraduate major is required for participation in graduate studies leading to this degree, but certain courses are prerequisites. Required are:

2 semesters of natural sciences
2 semesters of economics or political science, or 1 semester of each
2 semesters of psychology or sociology, or 1 semester of each
2 semesters of accounting, either basic or managerial

In selected cases, students who have not completed all prerequisites may be admitted on a conditional basis subject to completion of deficiencies while completing other requirements of the degree program.

PROGRAM FOR THE DEGREE. The program for this degree includes 36 graduate units, of which 18 are in courses in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology.

Completion of this program ordinarily requires 24 months. Included is a 12-month administrative residency which is conducted under faculty supervision in hospitals and other health agencies within commuting distance of the University campus. A portion of the residency is devoted to preparation and presentation of a written management study.

COMPREHENSIVE EXAMINATION. Successful completion of a comprehensive examination, consisting of both oral and written phases, is a prerequisite qualification for the M.H.A. degree.

## *The Doctor of Philosophy*

The Ph.D. degree is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

REQUIREMENTS FOR THE PH.D. DEGREE. The formal requirements, discussed in detail below, for the Ph.D. degree are as follows: (1) foreign languages; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence; (5) preliminary examination; (6) dissertation; (7) final examination. In

order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of *G* or better.

FOREIGN LANGUAGES. Normally, a reading knowledge of both French and German is required. (For methods of meeting this requirement, see p. 25.)

A student working toward the doctoral degree should complete the languague requirements for that degree by the end of his first year of residence. If he fails to meet these requirements by the end of his third semester of residence, he must register in the appropriate special reading course or courses (see page 26) until he has satisfied the requirements.

MAJOR OR MINOR. The student's program of study necessarily demands substantial concentration on courses in his major department. It must, however, include a minimum of six units in a minor subject or related fields approved by his major department. Use of related fields within the major department requires the approval of the Dean of the Graduate School.

COMMITTEE TO SUPERVISE THE PROGRAM OF STUDY. As early in a student's course of study as is practicable and *not later than two months before the preliminary examination* the Director of Graduate Studies in the major department will nominate for the approval of the Dean a supervising committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor if a minor is involved. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. However, should all members of the committee be from the major department, at least one member of another department will be added or substituted for the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

RESIDENCE. For students who first registered in September 1959 or thereafter the *minimum* registration requirement is 60 units of graduate credit not more than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the A.B. or B.S. degree must plan to spend in residence a *minimum* of two academic years; if he enters with the A.M., his *minimum* residence is one academic year.

(For the definition of *residence,* see page 21.) If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements if any above the minimum the student must meet.

For requirement of registration see Normal Registration above, page 21.

TIME LIMITATIONS. 1) At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2) The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3) The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

CREDIT FOR SUMMER WORK. Credit earned in the Summer Session will not reduce the minimum required residence (see above, page 21).

PRELIMINARY EXAMINATION. A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take the examination in this Graduate School. The examination ordinarily covers both the major and minor fields.

Except in unusual circumstances approved by the Dean, a preliminary examination will not be scheduled between the last day of the spring semester examination period and registration day in the fall semester.

PRIVILEGE OF RE-EXAMINATION. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

THE DISSERTATION. The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

FILING TITLE. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

FORM. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the *Manual of Style for Theses and Dissertations,* revised 1961, to be obtained from the Duke University Book Store, West Campus.

SUBMITTING DISSERTATION. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before *April 15* preceding the June commencement when the degree is to be conferred. The dissertation must be submitted to the Graduate Office from seven to ten days before the scheduled date of the student's examination.

PUBLICATION ON MICROFILM. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in *Dissertation Abstracts. Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure* together with a microfilming agreement which is signed and returned when the dissertation is finally deposited in the Graduate Office.

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an *abstract,* carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A nonreturnable dissertation fee of $25 is charged for handling and microfilming. If copyright is desired, an additional fee is charged of $6

plus 2½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is $5.00 a volume. The student may request that more than the two copies be so bound.

FINAL EXAMINATION. The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

## *The Doctor of Education*

The Doctor of Education degree is a professional degree planned for those who are, or intend to become, school administrators, supervisors, directors of instruction, curriculum consultants, or college teachers of education.

ADMISSION. The candidate for the Ed.D. degree must meet the same requirements for admission to the Graduate School as the candidate for the Ph.D. degree. In addition to these uniform requirements, the candidate for the Ed.D. (1) must have had at least two years' experience in educational work; (2) must present strong letters of appraisal and recommendation from persons well qualified to speak with authority of his abilities; and (3) must present himself, if possible, for a personal interview. The Standing Committee on the Ed.D. degree reserves the right to insist upon an interview.

*Persons who are primarily concerned with meeting requirements set by North Carolina for the advanced certificate for principals and supervision must request and secure admission for doctoral study.*

RESIDENCE, ETC. Regulations concerning residence requirements, grades required during the first year of graduate study, and the preliminary examination are the same as those for the Ph.D. (See pp. 34-37.)

FOREIGN LANGUAGES. There are no foreign language requirements for the Ed.D. degree.

PROGRAM OF WORK. The candidate for the Ed.D. degree will choose as his major field either Educational Administration and Supervision or Curriculum and Instruction.

Candidates in Administration and Supervision will take approximately 24 units in that field, including the seminar in School Administration. In addition, they will take approximately 18 units in other professional courses, and a minor of approximately 18 units approved by the candidate's supervisory committee and the Standing Committee on the Ed.D. degree.

Candidates in Curriculum and Instruction will take approximately 24 units in Curriculum and Instruction. In addition, they will take approximately 12 units in other professional courses, and a minor of approximately 24 units in the humanities, the natural sciences, or the social sciences, exclusive of professional education.

The program of work for each candidate must be approved by the Standing Committee for the Ed.D. degree.

DISSERTATION. The candidate must write a dissertation, for which the formalities of presentation, including its defense in a final examination, are the same as those for the Ph.D. degree. The type of dissertation will depend upon which of the following plans the candidate adopts:

Plan A. A candidate choosing Plan A will write a dissertation which is expected to be a mature and competent piece of writing, embodying the results of significant and original research. It must be, in essence, a contribution to knowledge.

Plan B. A candidate choosing Plan B will serve at least a year in an administrative post, or a teaching position in an elementary or secondary school, subsequent to the completion of all course requirements and a year of residence. His dissertation may be concerned with a problem, or several closely related problems, growing out of this experience. Although the dissertation written under Plan B is of a practical nature, it must demonstrate the candidate's ability to investigate and report on a significant phase of education in his major field.

PUBLICATION ON MICROFILM. The dissertation will be published on microfilm, as is the dissertation for the Ph.D. (See p. 37.)

FINAL EXAMINATION. Regulations for the final examination are identical with those for the Ph.D. degree. (See p. 38.)

# Awards and Fees

## *Fellowships, Scholarships, and Assistantships*

FOR the encouragement and financial assistance of graduate students of marked ability, Duke University has established a considerable number of fellowships, scholarships, and assistantships. The stipends for these range from $600 to $3,400. Holders of grants pay tuition and other fees regularly required of all graduate students.

Fellows and scholars pay full tuition and fees and are expected to register for a full schedule of course work each semester. In general, assistants register for a four-fifths program and pay 12 units tuition and fees per semester.

APPLICATION FOR AWARDS. Applications for these awards, along with all supporting documents, must be submitted on or before February 15. Notification of awards is made about April 1. Late applications will be considered, should any vacancies occur in the list of appointees. No appointment is made for longer than one academic year.

Further information and application forms may be obtained from the Dean of the Graduate School, Duke University.

Awards offered for 1964-65 are:

FELLOWSHIPS: Approximately thirty James B. Duke Fellowships with stipends of $3,400; one Angier Duke Memorial Fellowship of $3,400, one Ottis Green Foundation Fellowship in Humanities or Social Sciences of $2,500; four Gurney Harriss Kearns Fellowships in Religion ranging up to $2,800; University Fellowships ranging from $2,000 to $3,000.

UNIVERSITY SCHOLARSHIPS. The University offers a number of scholarships with stipends ranging from $600 to $1,800.

GRADUATE ASSISTANTSHIPS. Appointments as Departmental Assistants and readers carry a total stipend in the range of $1,000 to $3,100. The value of stipend is determined by the fraction of time given to assisting, the qualifications of the assistant, and the nature of work assigned.

RESEARCH ASSISTANTSHIPS. Appointment for predoctoral candidates whose special training and qualifications enable them to serve as assistants to individual staff members in certain departments. Stipends range from $600 to $3,000 based on the assisting time required.

Appointments to qualified, advanced students as Research Asso-

ciates, Research Fellows, and Research Scholars. Stipends range upward from about $1,800.

COKESBURY GRADUATE AWARDS IN COLLEGE TEACHING. These awards, sponsored by the Board of Education of the Methodist Church, are designed to assist graduate students who are committed to a Christian philosophy of higher education and who intend to teach in college. The applicant must have been a member of the Methodist Church for at least three years, and must have been accepted for or be currently pursuing a program of graduate studies at one of the Methodist-related universities, including Duke University, approved for this program. Awards, for one year, vary in amount from $600 to $2,500.

Application must be completed before February 15. For further information and application forms, apply to the Dean of the Graduate School.

CHARLES W. HARGITT RESEARCH FELLOWSHIP IN ZOOLOGY. The Charles W. Hargitt Research Fellowship in Zoology is devoted to the promotion of research in the field of cellular studies. It may be awarded to post-doctoral candidates or established investigators who desire to engage in research and to outstanding predoctoral candidates in support of their graduate training. The recipient will be expected to engage in full-time research or training and will have no departmental duties. Research facilities will be provided. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Chairman, Hargitt Fellowship Committee, Department of Zoology.

LILLY ENDOWMENT FELLOWSHIPS IN POLITICAL SCIENCE. These fellowships are available to qualified students who seek a Ph.D. in political science and who have an interest in exploring some aspect of the relationship between Christianity and the social order. Lilly Endowment Fellows will take their minor work in the Graduate Department of Religion and will ordinarily write their dissertations in the field of political theory. The stipend is a maximum of $3,000. Appointment is for one year with the possibility of reappointment. Inquiries may be directed to Professor John H. Hallowell, Department of Political Science, Duke University, and applications should be sent to the Dean of the Graduate School.

SHELL FELLOWSHIP IN ENGINEERING. This fellowship is established to encourage graduate studies leading to an M.S. or Ph.D. degree in engineering. Preferential consideration is given to candidates in electrical or mechanical engineering with particular preference to those in an advanced stage of their work toward the doctorate. This award provides for a single student or a childless married student a one-year stipend of $1,800, for a married student with one or

more children, a stipend of $2,100. In addition, the Fellowship provides actual tuition and fees required of the recipient, a special allotment of $500 to the major department to be applied toward equipment and materials needed by the Fellow in his research, and an additional allotment of $500 to the general fund of the University. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Dean, College of Engineering.

FELLOWSHIPS AND GRADUATE SCHOLARSHIPS IN FORESTRY. Information regarding special fellowships and graduate scholarships in forestry may be obtained from the Dean of the School of Forestry, Duke University, Durham, North Carolina.

FEDERAL FELLOWSHIP PROGRAMS. In 1963-64 Duke University was approved to offer programs sustained by National Defense Act Graduate Fellowships in Economics, History, Philosophy, Physics, Romance Languages, and Sociology, and Foreign Language Fellowships. The University is approved to recommend approximately twenty applicants for Cooperative Graduate Fellowships and Summer Fellowships for Graduate Teaching Assistants offered by the National Science Foundation and to offer NASA Predoctoral Traineeships in the space sciences.

PART-TIME INSTRUCTORS. A number of departments offering graduate work make use of exceptionally qualified graduate students as part-time instructors. These students are usually able to register for a graduate program of 9 units a semester. Inquiries concerning such appointments should be directed to the Chairman of the Department concerned.

PAYMENTS TO HOLDERS OF AWARDS. Payments of stipends to all graduate students holding fellowships, scholarships, and graduate assistantships for the academic year are made by the Bursar of the University in eight monthly installments payable on the 21st of each month beginning October 21st. Arrangements may be made to prorate tuition charges on the same basis.

LOANS. The University has been allotted a sum for use under the provisions of the National Defense Act Loan fund. In addition, University funds are available to grant low-interest loans to deserving students of good academic standing. Application should be made to Mr. W. O. Petty, Jr., 102B Allen Building, Duke University.

## *Financial Regulations*

The Graduate School awards such financial aid as fellowships, scholarships, and assistantships. The several departments engage part-time instructors who may be graduate students. The Treasurer of the

University, however, has sole responsibility for paying stipends to students, collecting from them such fees as are due, and making special arrangements for prorating fees.

GENERAL FEES IN THE ACADEMIC YEAR. The following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

| | |
|---|---|
| Tuition and general fees* ($40.00 per unit) | $600.00 |
| Athletic Fee, not including federal tax, optional, per year, payable in the fall semester | 15.00 |
| Room rent (see detailed statement p. 44) | |
| Fee for Microfilming, payable by candidates for a doctoral degree when the dissertation is presented to the Graduate Office after the final examination | 25.00 |

* General fees, in lieu of most special charges, include the following fees; Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Material Fees.

Tuition and fees for a full semester program of 15 units amount to $600.00. For a part program, tuition and fees are computed at the rate of $40.00 per unit.

SPECIAL FEES FOR TEACHERS AND OTHERS. The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in *full-time* teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives of Duke faculty members, (4) *full-time* employees of Duke University who are paid on a monthly basis throughout the year. The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon payment of a fee of $5.00 for registration for each semester and a tuition fee of $15.00 per unit of credit or an audit fee of $15.00 per course. The *in absentia* fee will not be charged at this rate.

AUDIT FEE. In a semester in which a student registers and pays fees for 12 units or more, he may audit one course without charge. Should he be permitted to audit a second course or should he be registered for less than 12 units, the audit fee is $15.00 per course.

FEE ADJUSTMENT WITH CHANGE OF REGISTRATION. Arrangements made with the Bursar to prorate tuition and fee charges

do not imply that the full amount is not due and payable on the date of fall and spring registration. During the fourteen-day period for change of registration (see Change of Registration, page 21) tuition and fees will be adjusted to necessary and approved changes. After the fourteen-day period no change of tuition and fees is possible.

STIPENDS AND INCOME TAX. Ordinarily stipends awarded under fellowships and scholarships are not subject to income tax. However, a portion of the award to graduate assistants may be subject to tax. The Graduate Office will supply detailed information.

# Facilities for Graduate Study

## *The Libraries*

THE University Libraries contain 1,600,000 volumes. In addition to the collections in the General Library, there are eight school and departmental libraries: Divinity, 106,743 volumes; Engineering, 31,847 volumes; Law, 129,838 volumes; Medical, 72,891 volumes; Woman's College, 138,299 volumes; Biology-Forestry, 80,338 volumes; Chemistry, 20,398 volumes; Mathematics-Physics, 26,277 volumes. In 1962-63, 54,948 volumes were added; 6,000 periodicals and 118 newspapers are received currently.

The General Library building, which was doubled in size in 1949, incorporates many modern arrangements for the preservation of the collections and for the convenience of the research scholar. Book stacks, storage areas, and quarters for rare books and manuscripts are air-conditioned. In the stacks, 274 carrels are available to graduate students as places of study, and a large reading room on the first floor of the building is reserved for graduate students. Upon application, graduate students may receive permit cards entitling them to use of the stacks.

A division of photographic services, with the most modern cameras and other equipment for microfilming or other photographic reproduction of printed and manuscript materials, provides a battery of reading machines to serve the Library's large collection of microfilms of rare books, periodicals, and newspapers.

The extensive resources of the Library for research students may be suggested by the following special collections:

THE TRENT COLLECTION OF WALT WHITMAN, containing the first and all other important early editions or issues of *Leaves of Grass;* books and articles of Whitman biography and criticism; nearly 300 manuscripts and 400 letters; and pictures, sheet music, and other miscellanea.

THE GEORGE WASHINGTON FLOWERS COLLECTION of books, manuscripts, pamphlets, and newspapers on all phases of Southern history.

THE ARENTS COLLECTION of several hundred volumes relating to the culture and production of tobacco and the manufacture and distribution of tobacco products.

THE JAMES A. THOMAS COLLECTION of books on Chinese history and culture.

THE GUIDO MAZZONI LIBRARY, a collection of approximately 23,000 volumes and 67,000 pamphlets covering the whole range of Italian literature, with special strength in the nineteenth century.

THE GUSTAVE LANSON LIBRARY of 12,000 books and monographs on French literature.

LATIN-AMERICAN COLLECTIONS, built around a special Peruvian library of 7,000 books and manuscripts, a Brazilian library of several thousand volumes, and an Ecuadorian library of 2,000 volumes, supplemented by strong collections of the public documents of these and other Latin-American countries.

THE ROBERTSON LIBRARY of Philippiniana.

THE FRANK C. BROWN FOLKLORE COLLECTION, consisting of about 38,000 manuscript pieces, 1,400 vocal recordings, and 650 musical scores of North Carolina folklore.

THE STRISOWER LIBRARY of International Law, numbering about 5,000 volumes, with many rare books and periodical files.

THE TRENT COLLECTION IN THE HISTORY OF MEDICINE (Hospital Library), containing about 3,000 books and 2,500 manuscripts with special strength in anesthesia, anatomy, English medicine, vaccination, yellow fever, pharmacy, and medical biography.

THE HOLL CHURCH HISTORY LIBRARY, dealing primarily with the period of the Reformation.

THE FRANK BAKER COLLECTION OF WESLEYANA AND BRITISH METHODISM, consisting of 1,500 editions of the works of John and Charles Wesley, 8,000 volumes concerning all phases of the development of British Methodism, 4,000 volumes relating to the religious and social background of British Methodism, and 4,000 manuscript pieces by the Wesleys and their coadjutors and by British Methodists of the last 200 years.

COLLECTIONS IN ENGLISH AND AMERICAN LITERATURE, where emphasis has been placed principally on the eighteenth and nineteenth centuries, with the collections of Swinburne, Tennyson, Rossetti, and Bryant, significant groups of annotated copies and first editions of Coleridge and Byron, the Carroll Wilson collection of Emerson, some 5,000 items of eighteenth-century English poetry and prose, and the Paul Hamilton Hayne library of American literature.

In addition to these and other special collections, the Libraries contain excellent files of United States federal and state documents, public documents of many European and Latin-American countries, and publications of European academies and learned societies. The newspaper collection, with 13,250 volumes and 12,550 reels of microfilms, has several long eighteenth-century files, strong holdings of nineteenth-century New England papers, and of ante-Bellum and

Civil War papers from North Carolina, South Carolina, and Virginia; there are also many European and Latin-American papers. The manuscript collection of 3,075,064 items is particularly strong in all phases of the history, politics, and social and economic life of the South Atlantic region, though it includes also significant papers in English and American literature, and several notable medieval manuscripts in both Greek and Latin.

HISPANIC STUDIES PROGRAM. The Graduate School offers an inter-departmental program of Hispanic studies leading to the A.M. and Ph.D. degrees. Students may write their theses and take their degrees in history, economics, political science, sociology, and Hispanic languages and literatures. The purpose of the program is to make possible desirable combinations of courses on the Hispanic world in these related disciplines and to bring to bear more strength of the faculty upon the training of a single candidate. This may be achieved through a judicious use of minors or by such special arrangements as may from time to time become necessary.

The Duke University Library holdings have been built up to facilitate graduate work and research in Hispanic-American cultural history, inter-American relations, economic history, politics, and Spanish-American literature. These collections are being constantly enlarged.

## *Science Laboratories*

BOTANICAL AND ZOOLOGICAL LABORATORIES. Facilities for graduate study in the Departments of Botany and Zoology are located on the West Campus. A new Biological Sciences building, completed in 1962, contains well-equipped modern laboratories for teaching and research in the various fields of botany, forestry, and zoology. Special facilities are available, such as animal rooms, greenhouses, darkrooms, refrigerated and controlled environment laboratories, electron microscope, Van de Graaff accelerator, X-ray machine and other radiation and radioisotope equipment, and other modern research facilities.

The Botany Herbarium, containing over 200,000 specimens, is particularly strong in material from the Southeast and includes notable collections of mosses, ferns, lichens and grasses. The Biology-Forestry Library contains an outstanding collection of books and periodicals. The Library currently subscribes to over 700 journals and has 80,338 volumes. Unique assets for teaching and research are the Sarah P. Duke Gardens, conveniently located on the West Campus; the Duke Forest, comprising 7,200 acres of woodland adjacent to the West Campus; the Field Station for the Study of Animal Behavior;

and the Duke University Marine Laboratory at Beaufort, North Carolina.

Scholarships for advanced study during the summer months are maintained at the Highlands Laboratory, Highlands, North Carolina, at the Marine Biological Laboratory, Woods Hole, Massachusetts, and at the Duke University Marine Laboratory. Requests for information concerning the scholarships at the Highlands Laboratory should be addressed to the Botany Department, those concerning scholarships at the Duke Marine Laboratory and at Woods Hole to the Zoology Department.

MARINE LABORATORY. Located at Beaufort, N. C., the Duke University Marine Laboratory was founded in 1938 as a result of the efforts of the late Professor A. S. Pearse. The well-equipped facilities, including four research buildings, classrooms, running sea water, motor vessels, living quarters and food service, provide excellent opportunities for graduate courses in botany and zoology every summer and for research activities throughout the year. Ten National Science Foundation predoctoral awards and four post-doctoral awards will be offered in 1964 for course or research work at the Marine Laboratory.

For information concerning these awards or for information about courses and research space at the Duke Marine Laboratory, write to the Director, Dr. K. M. Wilbur, Department of Zoology, Duke University, Durham, N. C.

ANIMAL BEHAVIOR STATION. Located less than one mile from the campus, the 70 wooded acres of the Station provide facilities for studies of penned and free-ranging, and caged animals. These facilities include sound-proof observation chambers, barns, aviaries, and pens for large mammals and birds, and two water-fowl ponds. For information regarding research space or research assistantships in Behavior, write to Dr. P. H. Klopfer, Dept. of Zoology, or Dr. D. K. Adams, Dept. of Psychology.

PHYSICAL LABORATORIES. The Physics Building, comprising about 77,000 square feet of floor space (to be increased to 130,000 by 1964), is devoted to the research and instruction of the Departments of Physics and Mathematics.

In addition to the lecture halls and the elementary laboratories, the building includes special laboratories for work in electrical measurements, electronics, microwaves, optical spectroscopy, and atomic, nuclear, and low-temperature physics. Special research equipment includes a 21-foot concave grating and other instruments for visible, ultraviolet and Raman spectra; facilities for research in microwave spectroscopy and other high-frequency phenomena; two Van de Graaff accelerators, one 4 MEV and one high intensity 3 MEV, and associated equipment for nuclear physics research; a helium liquifier, other low

temperature equipment and three large electromagnets for nuclear resonance research below 1° Kelvin.

The Physics Building contains the Mathematics-Physics library. an IBM 7072 computer, and a shop staffed by nine instrument mechanics, seven electronics technicians, and a glass blower.

CHEMISTRY LABORATORIES. The Chemistry Building has a floor area of approximately 57,000 square feet, of which more than half is devoted to advanced teaching and research. Modern instruments are available for routine measurements, as well as for research involving ultraviolet, visible, and infrared spectroscopy. Also provided are two nuclear magnetic spectrometers, one for routine analytical purposes, and the other, a high resolution instrument, for research. In addition to extensive equipment for X-ray crystallography, facilities are available for electron spin resonance measurements, polarography, light scattering, and vapor phase chromatography.

A well-equipped shop, operated by a competent mechanic, provides facilities for the construction of special apparatus and for repair and maintenance of instruments.

The Chemistry Library, conveniently located in the building, has on its shelves over 20,400 volumes, and currently subscribes to over 200 scientific periodicals.

PSYCHOLOGY LABORATORIES. The Psychology Department occupies new and fully renovated quarters, comprising about 53,000 square feet of floor space, which house its main laboratories, seminar rooms, classrooms, and special facilities. The building is completely air-conditioned for year-round research and study. For the use of graduate students and staff, the Department now houses a periodical reference room with an extensive collection of current and bound journals and monographs in psychology and related subjects. In addition to general purpose laboratories, there are special facilities for animal behavior studies; sound-proofed and electrically-shielded rooms for use with human and animal subjects; specially equipped rooms for the study of visual perception; electrophysiological recording rooms; a histological laboratory and surgery; photographic dark rooms, etc. The social psychology unit (joint with the Department of Sociology) contains observation, communication, and recording facilities for the study of social interaction. There is an extensive suite of interview and observation rooms for the study of human personality and clinical processes. A on-line digital computer is located in the animal behavior laboratories, and automatic computation equipment is available for all research purposes. A departmental shop, with competent technicians in charge, is maintained to provide specialized mechanical and electronic apparatus. Other facilities for research and teaching are available in the laboratories and clinics of the adjacent Duke Medical Center.

A number of clinical installations for adults and children, devoted to an extensive range of clinical and guidance problems, cooperate with the department in providing facilities for research and training. In addition, the Department operates a Preschool Laboratory for four- and five-year old children. The Department cooperates with the Department of Zoology in the operation of a 70-acre field station in the near-by Duke Forest for the study of animal behavior in natural settings. (See p. 50, Animal Behavior Station.)

THE PARAPSYCHOLOGY LABORATORY. The Parapsychology Laboratory, located in West Duke Building on East Campus, is an independent research center in the University, directed by Dr. J. B. Rhine.

The purpose of the Laboratory is to advance knowledge and understanding of man's nature through research in parapsychology. No course work is offered for credit, but participation by students and others of the University community in the work of the Laboratory has been welcomed. Graduate students from this as well as from other universities have conducted thesis research projects in, or with the assistance of, the Laboratory.

The Laboratory publishes the *Parapsychology Bulletin* and members of its staff edit the *Journal of Parapsychology,* now the affiliated periodical of the Parapsychological Association.

COMPUTING LABORATORY. Since 1958 an IBM electronic computer has been available in the Computing Laboratory for instruction in modern computing methods and for research. The Computing Laboratory is under the guidance of the Department of Mathematics and is located in the Physics Building. It is being used for research in the physical sciences, mathematics, and in medical and social sciences. The Laboratory is currently equipped with an IBM 1401-7072 system. This system offers many of the most recent advances in computing equipment. Suitable auxiliary machines for processing punched cards are also provided.

## *Engineering Laboratories*

The instructional and research laboratories, together with the library, classrooms, shops, and offices, are located in the Engineering Building on the West Campus. Those engineering laboratories of particular interest to graduate students are these:

*Civil Engineering:* experimental stress analysis: hydrodynamics; materials science; sanitary engineering; soil mechanics; and structural mechanics.

*Electrical Engineering:* solid-state materials; ferromagnetics; superconducting circuits; electronics; analog computer; automatic control; energy conversion; and spacecraft electrical systems.

*Mechanical Engineering:* heat transfer; fluid mechanics, environ-

mental thermodynamics; response of physical systems; and vibration studies.

These facilities are described in the *Engineering Bulletin*.

MEDICAL SCHOOL. In the School of Medicine elaborate facilities are provided for postgraduate research in the various branches of medical science. The Departments of Anatomy, Bacteriology, Mycology and Immunology, Biochemistry and Nutrition, and Physiology and Pharmacology offer certain courses and research facilities to students in the Graduate School of Arts and Sciences. The Duke Hospital Library is available to all graduate students.

## *Duke Forest*

The Duke Forest consists of approximately 7,200 acres of land, most of which is adjacent and easily accessible to the University campus. Situated in the lower Piedmont region and composed of second-growth shortleaf pine, loblolly pine, and hardwoods, the Forest is representative of the various types of timber growth and soils found throughout the region. Through placing the Forest under intensive management for forestry purposes, substantial progress has been made in developing the educational work and research in forestry.

The proximity of the Forest to the laboratories, greenhouses, and library facilities of the University provides an excellent opportunity for advanced study and research in forestry. Research, particularly in the fields of silvics, forest soils, silviculture, forest management, properties of wood, forest-tree physiology, forest entomology, and forest pathology, is well under way. Several members of the botany and zoology staffs are also engaged in research in the Duke Forest.

## *Forest Science Laboratory*

The establishment of the Forestry Sciences Laboratory research facility of the Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the Department of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The staff of the Laboratory is available for consultation, participation in seminars and may offer advice to students conducting research in the Department of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

## *Commonwealth-Studies Center*

The Commonwealth-Studies Center was established at Duke University in 1955 and has received financial support from the Carnegie

Corporation of New York, the Rockefeller Foundation, and the Ford Foundation. Its objectives are:

1. to encourage and stimulate by financial assistance and other means the research interests of individual scholars in Commonwealth fields,
2. to establish at Duke University a Center whose facilities will promote interest in research relating to the Commonwealth, provide the materials for basic research, and encourage research by Commonwealth and American students and faculty, and
3. to provide financial support for the systematic training of graduate students from Commonwealth countries at Duke University in the disciplines of economics, history, and political science.

The Center supports the University's graduate program in several ways. It has awarded fellowships to over forty graduate students from Australia, Canada, and New Zealand who have studied for the Ph.D. degree in economics, history, or political science at Duke University. Of this number twenty have already received their doctorates. National selection committees in each of the mentioned countries facilitate the selection of graduate students for fellowships and study at Duke University.

Each spring the Center sponsors a joint seminar for graduate students in economics, history, and political science, which focuses either on a geographical area of the Commonwealth or on certain political, economic, and social phenomena and developments within the Commonwealth. To date more than seventy students have participated in the seminar. In addition the Center sponsors occasional lectures at the University by distinguished Commonwealth scholars.

Research relating to the Commonwealth is undertaken by the members of the Committee on Commonwealth Studies and financial assistance is also provided to students and faculty at the University for field research in Commonwealth countries. Studies resulting from research sponsored by the Center are frequently published by the Duke University Press in the Commonwealth-Studies Series, which at the end of 1963 included nineteen volumes. The Center also distributes in its reprint series selected published articles that relate to the Commonwealth.

## *Program in Comparative Studies on Southern Asia*

The Program in Comparative Studies on Southern Asia was established at Duke University in 1961 following a grant from the Ford Foundation to the Commonwealth-Studies Center to enable it to develop a research and training program on that area. The basic

purpose of this program is twofold: to facilitate research on the political and economic development of Commonwealth countries of Southern Asia (India, Pakistan, Ceylon, and Malaysia), and to provide for the systematic training of graduate students in anthropology, economics, history and political science, with special emphasis on that area.

Although responsibility for approving basic policies for the Program in Comparative Studies on Southern Asia rests with the Committee on Commonwealth Studies, a subcommittee has authority to make recommendations on policy matters and to carry out the operations of the Program.

Graduate students participating in the program pursue studies looking to the Ph.D. degree in anthropology, economics, history, or political science. They are enrolled in the respective departments and must meet all the departmental requirements for the doctorate. In addition it is expected that students will take Hindi and Urdu and cognate courses in other departments.

In 1963 the University concluded a contract with the United States Office of Education for the establishment at Duke University of a language and area training center in Hindi and Urdu under the provisions of Title VI of the National Defense Education Act. As a result of the financial support of that office, the University has increased the course offerings in Hindi and Urdu by adding a third-year course of intensive Hindustani and enlarging its language staff.

The Program awards each year a limited number of pre-doctoral fellowships for graduate students pursuing the Ph.D. degree program in the mentioned disciplines. Graduate students interested in Southern Asia also may apply for NDEA Title VI language fellowships, which are awarded by the United States Office of Education. Recipients of such fellowships must take the Hindustani courses offered at Duke University; they may pursue the Ph.D. degree program in anthropology, economics, history, or political science.

Under the Program's auspices an interdepartmental seminar for graduate students in anthropology, economics, history, and political science is usually offered in the Spring Semester. Senior Commonwealth and American scholars present papers at the seminar and provide valuable cross cultural and interdisciplinary contacts for the graduate students.

Facilitation and support of research activities by members of the Duke University faculty and graduate students is an important aspect of the Program's activities. It supports through travel grants and subsistence allowances field research by persons affiliated with the University; the research must relate to the political problems of economic development and the historical factors pertinent to the transition from colonial to independent status. Research grants for

faculty and students are also available from the American Institute of Indian Studies, the United States Office of Education, and the Social Science Research Council.

It is expected that all candidates for the Ph.D. degree participating in the Program will undertake field research in the preparation of their dissertation.

The Executive Secretary for the Commonwealth-Studies Center and the program in Comparative Studies on Southern Asia is Dr. Don C. Piper.

## *Oak Ridge Institute of Nuclear Studies*

Duke University is one of the sponsoring universities of the Oak Ridge Institute of Nuclear Studies located at Oak Ridge, Tennessee. The graduate research program at Duke has available to it all the facilities of the Oak Ridge National Laboratory and the cooperative supervision of student research by the staff at Oak Ridge.

Fellowships in several fields of science are available to qualified applicants.

GRADUATE FELLOWSHIP PROGRAM. On application by a university the Institute awards fellowships to candidates for the master's and doctor's degree, after the student has completed all the course requirements for the degree. The student uses the fellowship to conduct his thesis research in an Oak Ridge laboratory.

AEC SPECIAL FELLOWSHIPS. These are available in the fields of (1) Nuclear Science and Engineering, (2) Health Physics, (3) Advanced Training in Health Physics, and (4) Industrial Hygiene.

The application deadlines differ for different fellowships. Further information may be obtained from Karl M. Wilbur, Department of Zoology.

## *Cooperative Programs with the Consolidated University of North Carolina*

INTERCHANGE OF REGISTRATION. (See pp. 22-23.)

LIBRARY EXCHANGE. Students of both the University of North Carolina and Duke University are granted certain library privileges in the respective libraries of each University. Books unavailable in one library may be procured at short notice through an interlibrary loan service.

## *Research and Publications*

The several departments of the University are devoted to research as well as to instruction. Since the University exists for the promotion and diffusion of knowledge, attention is rightly placed, in the Graduate School, on research activities.

In furtherance of the University's obligation to promote and diffuse knowledge, the President annually appoints a University Council on Research, which receives applications from members of the various faculties for subsidies in support of research. Vigorous and forward-looking policies of this Research Council have initiated and encouraged the completion of many substantial and important research projects.

The Duke University Press takes its place as a significant agency in the diffusion of knowledge. Created in 1925, as a successor to the Trinity College Press, the Duke University Press continued the publication of the *South Atlantic Quarterly,* published at Trinity College since 1902, and in 1926 revived the *Hispanic-American Historical Review,* which had been founded and published from 1918 to 1922 by a group of scholars interested in Hispanic America. In 1929 *American Literature* was begun with the cooperation of the American Literature Group of the Modern Language Association. This journal was followed in 1931 by *Ecological Monographs,* and in 1932, *Character and Personality* (since 1945 the *Journal of Personality*). In 1935 the Press began the publication of the *Duke Mathematical Journal.* Since 1948, it has published *Ecology,* the official journal of the Ecological Society of America. The Law School of Duke University publishes *Law and Contemporary Problems, The Duke Bar Journal,* and *The Journal of Legal Education. The Journal of Parapsychology* has been published at Duke since 1937.

The Press, since its organization, has published more than three hundred and twenty-five volumes, including four series of monographs, and has thus made public the fruits of scholarly research of the Duke faculty and of scholars elsewhere. In the broadest sense, the policy of the Press is to make available to the public any scholarly work that merits publication though special attention is given to works in domains of knowledge cultivated by the University.

# Courses of Instruction

In general, courses with odd numbers are offered in the fall semester, those with even numbers in the spring semester. Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course, credit may be received for either semester without special permission.

Normally, courses which bear no date are offered every year; those marked with an asterisk are offered only when the need arises.

**Note: In each department the number 399 is reserved to designate special (individual readings in a specified area and supervised by a regular member of the Graduate staff, credit 1-3 units each registration, 9 units maximum in three successive registrations. The course is restricted to resident doctoral programs, should have a completion exercise, and must carry a grade. When used it appears in this form: [Department] 399, Special Reading in [area], (Instructor), [2 or 3] units.**

## ANATOMY

PROFESSOR MARKEE, CHAIRMAN; ASSOCIATE PROFESSOR DUKE, DIRECTOR OF GRADUATE STUDIES—431 MEDICAL SCHOOL; PROFESSORS EVERETT, HETHERINGTON AND PEELE; ASSOCIATE PROFESSORS BECKER AND MOSES

The Department of Anatomy offers graduate courses and training leading to the A.M. and Ph.D. degrees. Further information may be obtained from the Director of Graduate Studies of the department. (See MEDICAL SCHOOL, p. 116.)

M201. ANATOMY AS RELATED TO LOCOMOTION.—Complete dissection of that part of the body concerned with locomotion and posture. (See also Course M205). September to January. Prerequisite: One year each of biology, chemistry, and physics. 6 units.

PROFESSORS MARKEE AND EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M202. MICROSCOPIC ANATOMY.—Conferences and laboratory work on the morphological characteristics of the tissues of the animal body. The work is based upon a study of fresh and prepared material and is approached from the physiological viewpoint. Sept. to Jan. Hours and credits (maximum 3 units) by arrangement. Prerequisite: adequate training in histology or cytology.

PROFESSORS MARKEE, HETHERINGTON, AND EVERETT; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M203. ANATOMY OF THE NERVOUS SYSTEM.—A study of the gross and microscopic structure of the human central nervous system, special attention being paid to the structural and functional relationships between the various nuclei and fiber tracts. Feb. to June. Hours and credits (maximum 4 units) by arrangement. Prerequisite: Anatomy M201.

PROFESSORS MARKEE, EVERETT, AND PEELE; ASSOCIATE PROFESSORS BECKER AND DUKE

M204. NEUROANATOMICAL BASIS OF BEHAVIOR.—A study of the gross and microscopic anatomy of the nervous system with emphasis on the structural and functional relationship between tracts, nuclei, and cortical areas. Restricted to graduate students with the equivalent of a major in psychology. (Jan. to June) 3 units.

PROFESSORS HETHERINGTON AND PEELE

M205. ANATOMY OF THE VISCERA.—This is a study of the Gross Anatomy of the thoracic, abdominal and pelvic organs and the deeper structures of the head. This course may be taken concurrently with M201. Sept. to Jan. Prerequisites one year each of physiology, chemistry, and physics. 2 units.

PROFESSORS MARKEE, EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M301. GROSS HUMAN ANATOMY.—A course especially for Ph.D. candidates in Anatomy, comprising a complete dissection of the cadaver. The laboratory work is supplemented by conferences which place emphasis on the biological aspects of the subject. Sept. to June. Hours and credits (maximum 8 units) by arrangement. Prerequisite: adequate training in comparative anatomy and embryology.
PROFESSORS MARKEE AND EVERETT; ASSOCIATE PROFESSORS BECKER AND DUKE

M312. RESEARCH.—Individual investigations in the various fields of anatomy. Credits to be arranged. PROFESSORS MARKEE, EVERETT, HETHERINGTON, AND PEELE; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M313-314. ANATOMY SEMINAR.—Weekly meeting of graduate students and staff in which current research problems in Anatomy will be presented. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units. Sept. to Jan. PROFESSORS MARKEE, EVERETT, HETHERINGTON, AND PEELE; ASSOCIATE PROFESSORS BECKER, DUKE, AND MOSES

M404. INTERDISCIPLINARY SEMINAR IN THE PHYSIOLOGICAL AND ANATOMICAL BASES OF BEHAVIOR.—Weekly meeting of graduate students and staff in which current problems in Anatomy, Physiology, and Psychology Behavior will be presented. Many of the presentations will be made by visiting scholars who will also be available for small group discussions. (Also listed as Physiology M404 and Psychology 404). 1 unit. Feb. to June.
PROFESSORS MARKEE, HALL, ZENER, AND PEELE; ASSOCIATE PROFESSORS BECKER AND DIAMOND

## ART

PROFESSORS HALL AND PATRICK; VISITING BENJAMIN N. DUKE PROFESSOR OF ART BIER; ASSOCIATE PROFESSORS MARKMAN AND SUNDERLAND

No graduate degree is offered in this department, but the following courses are suggested as possible minors for students majoring in history, literature, philosophy, religion, psychology, or sociology, or in any other interested department.

215. RELIGIOUS ART OF THE ANCIENT NEAR EAST.—A specialized study of the development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part of Syria and Palestine, to the Persian conquest. 3 units.* (W) ASSOCIATE PROFESSOR MARKMAN

216. RELIGIOUS ART OF THE CLASSICAL WORLD.—A specialized study of the religious art, particularly architecture and sculpture, of Greece and Rome, with special emphasis on the monuments in the Near East. 3 units* (W)
ASSOCIATE PROFESSOR MARKMAN

217. AEGEAN ART.—A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 2 units. (W) ASSOCIATE PROFESSOR MARKMAN

218. EARLY GREEK ART.—A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 units. (W)
ASSOCIATE PROFESSOR MARKMAN

221-222. HISTORY OF AESTHETICS.—Theories of art and beauty in the western world from antiquity to the present. Some attention will be given to the developed theories of aesthetics in the Far East. 6 units. (E) PROFESSOR PATRICK

233. EARLY MEDIAEVAL ARCHITECTURE.—The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 units. (E)
ASSOCIATE PROFESSOR SUNDERLAND

234. ROMANESQUE SCULPTURE.—The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 units. (E)
ASSOCIATE PROFESSOR SUNDERLAND

236. GOTHIC SCULPTURE.—Tilman Reimenschneider and the late Gothic German sculpture, comparing his work with that of other artists of the period. 3 units.* (E)
VISITING B. N. DUKE PROFESSOR BIER

239. ARCHITECTURE OF BRITAIN.—After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 units. (E) ASSOCIATE PROFESSOR HALL

240. ARCHITECTURE OF NORTH AMERICA.—A study illustrating the transplantation of European architectural customs since the sixteenth century; the time-lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 units. (E) ASSOCIATE PROFESSOR HALL

292. RESEARCH PROBLEMS IN THE COLLECTIONS OF THE NORTH CAROLINA MUSEUM OF ART.—Students will meet once every week in the museum in Raleigh. Each student will submit a report on his particular research project. 3 units.* (E) VISITING B. N. DUKE PROFESSOR BIER

## BIOCHEMISTRY AND NUTRITION

PROFESSOR HANDLER, CHAIRMAN—237 BELL BUILDING; ASSOCIATE PROFESSOR BYRNE, DIRECTOR OF GRADUATE STUDIES—218 BELL BUILDING; PROFESSORS TANFORD AND WYNGAARDEN; ASSOCIATE PROFESSORS F. BERNHEIM, DAVIDSON, GUILD, HILL, KAMIN, LYNN, MCCARTY, THIERS, AND WAKIL; ASSISTANT PROFESSORS FRIDOVICH, GREENE, KIRSHNER, AND WHEAT; ASSOCIATE ROSETT

(See MEDICAL SCHOOL, p. 116.)

In the Department of Biochemistry graduate work is offered leading to the Ph.D. degree. A brochure may be requested from the department which describes the departmental facilities, the staff, the Ph.D. program, the special trainee stipends which are available to Ph.D. candidates in Biochemistry, and an M.D.-Ph.D. program.

Prerequisites are specified for each course, but interested students who cannot meet the requirements may be admitted by permission of the instructor.

FOR SENIORS AND GRADUATES

201. INTRODUCTORY BIOCHEMISTRY.—Three lectures and one conference per week. A rigorous introduction to fundamental aspects of biochemistry which emphasizes chemistry of biologically occurring macromolecules, mechanism of enzyme action, energy transformations, metabolic pathways, and biochemical genetics. 4 units. PROFESSOR HANDLER

203. CHEMISTRY OF NATURAL PRODUCTS.—This course will emphasize the organic chemistry of carbohydrates, lipids and steroids; aspects of stereochemistry, conformational analysis and physical methods of structural investigation will be discussed. Prerequisite: chemistry through organic; Biochemistry 201 or its equivalent is suggested. 2 units. ASSOCIATE PROFESSOR DAVIDSON

206. LABORATORY METHODS IN BIOCHEMISTRY.—A laboratory course emphasizing the procedures and instruments of biochemical research. Each technique is employed in the course of a classical experiment demonstrating an important biochemical finding. Because the experimental materials are labile, one full day per week is spent in the laboratory. Prerequisite: Biochemistry 201 or equivalent. 2 units. ASSOCIATE ROSETT

FOR GRADUATES

301. ENERGY METABOLISM.—A lecture and seminar course on the metabolism of carbohydrates, lipids and biological oxidations; emphasizing energy production and utilization. Prerequisites: Biochemistry 201, 203 suggested. 3 units.
ASSOCIATE PROFESSOR WAKIL AND ASSISTANT PROFESSOR WHEAT

302. NITROGEN METABOLISM.—An intensive study, in lecture and seminar, of the metabolism of inorganic nitrogen compounds, proteins, and their component amino acids. Prerequisite: Biochemistry 201. 2 units. (Not 1964-65)
ASSOCIATE PROFESSOR KAMIN AND ASSISTANT PROFESSORS KIRSHNER AND GREENE

304. PROTEINS AND ENZYMES.—The chemical and physical properties of proteins and enzymes. Thermodynamics, kinetics, and mechanisms of enzyme-catalyzed reaction. Prerequisites: Biochemistry 201 and physical chemistry equivalent to Chemistry 261-262. 4 units.

PROFESSOR TANFORD AND ASSOCIATE PROFESSORS HILL AND BYRNE

314. NUCLEIC ACIDS AND GENETIC MECHANISMS.—A lecture and seminar course on nucleic acids in biology with emphasis on the physical and chemical basis of their role as the structural units of heredity. Prerequisite: Biochemistry 201; 203 is suggested. 2 units. ASSOCIATE PROFESSOR GUILD

345-346. SEMINAR.—Required of all graduate students majoring in biochemistry. 1 unit each semester. ASSISTANT PROFESSOR FRIDOVICH

348. SPECIAL TOPICS.—A lecture series on topics of current interest in biochemistry. 1 or 2 units. ASSOCIATE PROFESSOR MCCARTY

## BOTANY

ASSOCIATE PROFESSOR JOHNSON, CHAIRMAN, 141 BIOLOGICAL SCIENCES BUILDING; PROFESSOR BILLINGS, DIRECTOR OF GRADUATE STUDIES, 142 BIOLOGICAL SCIENCES BUILDING; PROFESSORS ANDERSON, HARRAR, KRAMER, NAYLOR, OOSTING, AND PERRY; ASSOCIATE PROFESSORS HUMM, PHILPOTT, AND WILBUR; ASSISTANT PROFESSORS CULBERSON, STONE, AND WHITE

Graduate work in the Department of Botany is offered leading to the A.M. and Ph.D. degrees. Before undertaking graduate study in botany a student should have had in his undergraduate program at least 12 semester hours of botany beyond an elementary course, and related work in biological sciences. Some work in chemistry and physics will be desirable and, for some phases of botanical study, a necessity. The student's graduate program is planned to provide a broad basic training in the various fields of botany, plus intensive specialization in the field of the research problem.

202. GENETICS.—The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. Offered in alternate years. Prerequisites: one year of botany, zoology, or equivalent, and college algebra. 4 units. (Not 1964-65) PROFESSOR PERRY

203. PLANT CYTOLOGY.—A study of the structure and organization of plant cells in relation to growth, reproduction, and especially heredity. Prerequisite: one year of botany. (This is the same course as Zoology 243.) 4 units

PROFESSOR ANDERSON

204. ADVANCED PLANT ANATOMY.—A study of vegetative and reproductive tissue of vascular plants including selection and preparation of fresh plant materials. An analysis of some of the significant literature bearing upon function, development, and phylogeny. Prerequisite: Botany 55 or equivalent. 4 units.

ASSISTANT PROFESSOR WHITE

221. INTRODUCTORY MYCOLOGY.—Field and laboratory study of the vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: a year of biological science. 4 units.

ASSOCIATE PROFESSOR JOHNSON

225-226. SPECIAL PROBLEMS.—Students with adequate training may do special work in the following: (1) Mycology and Plant Pathology, (2) Cytology, (3) Ecology, (4) Genetics, (5) Morphology and Anatomy of Higher plants, (6) Morphology and Taxonomy of Lower Groups, (7) Physiology, (8) Taxonomy of Higher Groups, (9) Microbiology, (10) Experimental Taxonomy. Credits to be arranged.

ALL MEMBERS OF THE GRADUATE STAFF

240. PLANT EVOLUTION.—Microevolutionary change and factors influencing its rate and direction, with primary emphasis on examples from the plant world. 3 units. ASSISTANT PROFESSOR STONE

252. PLANT METABOLISM.—The physio-chemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 units. PROFESSOR NAYLOR

254. PLANT-WATER RELATIONS.—A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 units. PROFESSOR KRAMER

255. ADVANCED TAXONOMY.—A study of the historical background of plant taxonomy, modern concepts and systems of classifications, nomenclatorial problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 units. ASSOCIATE PROFESSOR WILBUR

256. COMMUNITY ANALYSIS AND CLASSIFICATION.—The development of concepts and methods in synecology and their present application to the study of plant communities. Prerequisite: Botany 156 or equivalent. 3 units. PROFESSOR OOSTING

257. PRINCIPLES OF PLANT DISTRIBUTION.—Interpretation of the floristic and ecological plant geography of the world's vegetation. Prerequisite: Botany 156 or equivalent. 3 units. (Not 1964-65). PROFESSOR BILLINGS

258. PHYSIOLOGY OF GROWTH AND DEVELOPMENT.—Consideration of the internal factors and processes of new protoplasm and its differentiation at the cellular, tissue, and organ level in plants. Prerequisites: Botany 151 or equivalent; organic chemistry recommended. 4 units. PROFESSOR NAYLOR

259. THE ENVIRONMENT.—Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 units. PROFESSOR BILLINGS

260. LICHENS.—The morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 2 units. ASSISTANT PROFESSOR CULBERSON

305. VEGETATION OF NORTH AMERICA.—Distribution and limits of the major plant communities, a study in ecological plant geography. Prerequisite: Botany 156 or equivalent. 3 units. (Not 1964-65) PROFESSOR OOSTING

310. BRYOPHYTES.—The morphological and systematic characteristics of mosses and liverworts. 2 units. (Not 1964-65) PROFESSOR ANDERSON

311. ALGAE.—The morphological and ecological characteristics of the common freshwater and marine species and the principles underlying their classification. Collecting, identification, and the making of permanent microscopical preparations. 2 units. ASSOCIATE PROFESSOR HUMM

359-360. RESEARCH IN BOTANY.—Individual investigation in the various fields of botany. Credits to be arranged. ALL MEMBERS OF THE GRADUATE STAFF

### FOREST BOTANY

FOR SENIORS AND GRADUATES

253. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisite: one year of botany. 3 units. PROFESSOR HARRAR

RELATED COURSE IN OTHER DEPARTMENTS

This related course may be counted toward a major in botany: Forestry 257.

## CHEMISTRY

PROFESSOR SAYLOR, CHAIRMAN—115 CHEMISTRY BUILDING; PROFESSOR BRADSHER, DIRECTOR OF GRADUATE STUDIES—124 CHEMISTRY BUILDING; PROFESSORS BROWN, GROSS, HAUSER, HILL, HOBBS, KRIGBAUM, AND WILDER; ASSOCIATE PROFESSORS POIRIER, QUIN, SMITH, AND STROBEL; ASSISTANT PROFESSORS JONES, TOREN, AND WELLS; ADJUNCT PROFESSORS PETERLIN AND STANNETT

In the Department of Chemistry graduate work is offered leading to the A.M. and Ph.D. degrees. Before undertaking a graduate program in chemistry, a student

should have taken an undergraduate major in chemistry, along with related work in mathematics and physics.

Graduate courses in the department are designed to provide a broad basic training in the fields of inorganic, organic, analytical, and physical chemistry. An important requirement for the Ph.D. degree is the successful completion, under the direction of a member of the staff, of a research program leading to the solution of an original problem. The choice of the research problem, for either the A.M. or the Ph.D. degree, will determine the field of advanced specialization.

FOR SENIORS AND GRADUATES

206. ELEMENTS OF THEORETICAL CHEMISTRY.—A one-semester course in the general principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitations and three laboratory hours. Prerequisites: quantitative analysis, organic chemistry 8 units: physics 8 units, and introductory calculus. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 units. PROFESSOR SAYLOR

215. ADVANCED INORGANIC CHEMISTRY.—A study of modern theories of valence and molecular structure and inorganic compounds, particularly the less common types. Prerequisite: Physical Chemistry. 3 units. PROFESSOR HILL

216. NUCLEAR CHEMISTRY.—Elementary theory of nuclear reactions, properties of isotopes, and tracer techniques. Two lectures and three laboratory hours. Prerequisites: Introductory physics, analytical and organic chemistry. 3 units. PROFESSOR HILL

234. CHEMICAL INSTRUMENTATION.—Discussion of physico-chemical principles as applied to instrumental methods of analysis, illustrated by laboratory experiments with emphasis on methods involving electrical techniques. One lecture and three laboratory hours per week. Prerequisites: quantitative analysis and physical chemistry; the latter may be taken concurrently. 2 units. ASSOCIATE PROFESSOR STROBEL AND ASSISTANT PROFESSOR TOREN

251. QUALITATIVE ORGANIC ANALYSIS.—Systematic identification of organic compounds, including a study of solubilities and classification reactions. One lecture and three or six laboratory hours per week. Prerequisites: quantitative analysis and 8 units of organic chemistry. 2 or 3 units. PROFESSOR HAUSER

252. ADVANCED ORGANIC PREPARATIONS.—A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory exercises accompanied by oral discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture, with lectures in alternate weeks. Prerequisites: quantitative analysis and 8 units of organic chemistry. 2 units. PROFESSOR BROWN

253. INTERMEDIATE ORGANIC CHEMISTRY.—An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: 8 units of organic chemistry. 3 units. PROFESSOR WILDER

271. INTRODUCTION TO RESEARCH.—Lectures on the use of chemical literature, research methods, recording and publication of results, and other topics. One lecture per week. 1 unit. PROFESSOR BROWN

275, 276. RESEARCH.—The aim of this course is to give instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units. ALL MEMBERS OF THE GRADUATE STAFF

FOR GRADUATES

303. THERMODYNAMICS.—Fundamental laws of thermodynamics and their application to chemistry. Prerequisites: Physical chemistry and one year of calculus. 3 units. PROFESSOR SAYLOR

304. PHYSICAL CHEMISTRY OF REACTIONS.—The theoretical aspects of reaction kinetics, chemical equilibrium, atomic and molecular forces, and the relation of these to chemical reactions are considered. Prerequisite: Physical chemistry. ASSOCIATE PROFESSOR SMITH

331, 332. SEMINAR IN ANALYTICAL AND INORGANIC CHEMISTRY.—Lectures, oral reports, and discussion on advanced topics and recent advances in the

allied fields of analytical and inorganic chemistry. Prerequisites: Chemistry 215 and 234. 2 units. PROFESSORS HILL AND SAYLOR

342. ADVANCED ORGANIC CHEMISTRY.—Consideration is given to principles, theories and mechanism, as well as the usefulness in reactions, of organic reactions involving basic and acidic reagents. Prerequisite: Chemistry 253. 2 units. PROFESSOR HAUSER

350. ORGANIC REACTIONS.—A study of the scope and limitations of the more important types of reactions of organic chemistry from the point of view of their practical use in the synthesis of organic compounds. Prerequisite: Chemistry 253. 2 units. (Spring 1965) PROFESSOR BRADSHER

352. MECHANISMS OF ORGANIC REACTIONS.—Mechanisms of various organic reactions are considered. Lecture or seminar one hour each week. Prerequisite: Chemistry 342. 1 unit. PROFESSOR HAUSER

353. SPECIAL TOPICS IN ORGANIC CHEMISTRY.—Various topics of interest to the organic chemist will be surveyed such as the chemistry of heterocyclic compounds, organometallic and organometalloid chemistry, terpenes, sesquiterpenes and steroids, small ring compounds, ring formation and transannular interactions. 2 units. ASSOCIATE PROFESSOR QUIN

354. STEREOCHEMISTRY.—A study of recent advances in stereochemistry of organic compounds including conformations and stereospecific reactions. The use of spectrophotometric methods for the determination of structure will be discussed. Prerequisites: Chemistry 251 and 341. 2 units. (Not 1964-65) PROFESSOR WILDER

360. POLYMER CHEMISTRY.—A survey of the methods of preparation of high-molecular-weight organic compounds and a study of the properties characteristic of macromolecules in solution and in the solid state. Prerequisite: Chemistry 303. 2 units. ASSOCIATE PROFESSOR KRIGBAUM

361. ADVANCED POLYMER CHEMISTRY.—A number of topics in the chemistry and physics of high polymers will be discussed, including polymerization mechanisms and kinetics, crystallization and morphology of high polymers and solution properties. Prerequisite: Chemistry 360. 2 units. ADJUNCT PROFESSORS PETERLIN AND STANNETT

363, 364. SPECIAL TOPICS IN PHYSICAL CHEMISTRY.—Various topics in Physical Chemistry which are of special interest to the staff or students are considered such as absorption and scattering of light, dielectric phenomena, electrode processes, electrolyte theory ion exchange, molecular structure and solubility. Seminar. Prerequisites: Physical chemistry and Chemistry 303. PROFESSORS GROSS, HILL, HOBBS, AND SAYLOR; ASSOCIATE PROFESSORS SMITH, KRIGBAUM, POIRIER, AND STROBEL

365, 366. CHEMICAL PHYSICS, STATISTICAL THEORY.—General introduction to classical and quantum statistical mechanics and applications to chemical problems including: calculation of thermodynamic functions of gases, liquids and solids; solution theory; reaction velocity; and changes of state. 6 units. (365, Not 1964-65; 366, Fall 1964-65) ASSOCIATE PROFESSOR POIRIER

367, 368. CHEMICAL PHYSICS, QUANTUM THEORY.—General introduction of the quantum theory of atomic and molecular forces and the structure of matter. 6 units. (367, Spring 1964-65; 368, Not 1964-65) ASSISTANT PROFESSOR JONES

373, 374. SEMINAR.—Required of all graduate students in chemistry. One hour a week discussion. 2 units. ALL MEMBERS OF THE GRADUATE STAFF

## CLASSICAL STUDIES

PROFESSORS ROGERS, TRUESDALE, AND WILLIS

### GREEK

FOR SENIORS AND GRADUATES

201-202. GREEK TRAGEDY. 6 units.* PROFESSOR TRUESDALE

257. SOCIAL AND CULTURAL HISTORY OF THE HELLENISTIC WORLD

FROM ALEXANDER TO AUGUSTUS.—Lectures, reading, and discussions. This course will not be separately credited without the sequel, Latin 258. 3 units.
PROFESSOR ROGERS

Graduate students of Duke University may attend the American School of Classical Studies in Athens, Greece, without charge for tuition, and they are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology, and one in the language, literature, and history of ancient Greece, each with a stipend of $2,000. They are awarded mainly on the basis of examination held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.

### LATIN

FOR SENIORS AND GRADUATES

211-212. ROMAN ORATORY.—A survey of the history of Roman oratory, centering about the *Brutus* of Cicero and Tacitus' *Dialogus*. 6 units.*
PROFESSOR ROGERS

258. SOCIAL AND CULTURAL HISTORY OF THE GRAECO-ROMAN WORLD.—The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues Greek 257 and will not be separately credited. 3 units.
PROFESSOR ROGERS

RELATED COURSES IN OTHER DEPARTMENTS

Philosophy 217; Religion 217, 313, 316, 318.

Under the terms of a co-operative agreement graduate students of Duke University may, with the approval of the chairman of their major department, take any graduate course offered by the Department of Greek and Latin of the University of North Carolina by the payment of a nominal fee. A list of these courses will be sent upon request.

## COMPARATIVE LITERATURE

No graduate degree is offered in Comparative Literature. The following courses may serve in the minor programs of students in other departments. Professor Salinger is Chairman of the Department of Germanic Languages and Literature.

201, 202. ROMANTICISM.—Studies in the origin, rise and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany with some reference to other countries. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units. (1964-65)
PROFESSOR SALINGER

203, 204. REALISM AND SYMBOLISM.—Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy, tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units. (Not 1964-65)
PROFESSOR SALINGER

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 3 units. (1964-65)
PROFESSOR SALINGER

## ECONOMICS

PROFESSOR DE VYVER, CHAIRMAN—307 SOCIAL SCIENCE; PROFESSOR SMITH, DIRECTOR OF GRADUATE STUDIES—304 SOCIAL SCIENCE; PROFESSORS BLACK, FERGUSON, HANNA, HOOVER, LANDON, MCGEE, AND SPENGLER; ASSOCIATE PROFESSORS DAVIES, GERHARD, GOODWIN, AND YOHE; ASSISTANT PROFESSORS DE ALESSI AND WALLACE

The Department of Economics offers graduate work leading to the A.M. and Ph.D. degrees. A student entering graduate work in economics should have com-

pleted with satisfactory grades at least 12 semester hours of undergraduate work in economics, including 6 hours of Principles of Economics. Among the undergraduate courses of distinct advantage to the graduate student in economics are General Accounting, Elementary Statistics, Intermediate Economic Theory, Money and Banking, International Trade, and basic courses in philosophy, psychology, mathematics, and social sciences other than economics.

Requirements for the Ph.D. in economics include a core of courses in Mathematical Economics, Statistical Methods, Micro- and Macro-economic Theory, Economic History, and the History of Economic Thought. Economic Growth and Demography, Money and Banking, International Trade, Economic Systems, Labor Economics, Public Finance, and Industrial Organization are optional fields, of which the student elects at least three in preparation for the preliminary doctoral examination. Course requirements for the Ph.D., including a minor field, may be completed in four semesters of residence.

FOR SENIORS AND GRADUATES

218. BUSINESS CYCLES.—The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories; modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 units.† ASSOCIATE PROFESSOR YOHE

233. STATE AND LOCAL FINANCE.—A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. 3 units.†
ASSOCIATE PROFESSOR DAVIES

237-238. STATISTICAL METHODS.—A study of statistical methods appropriate for dealing with problems in business and the social sciences. In addition to developing more thoroughly the subject considered in *Business Statistics,* the following methods will be considered: multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the instructor. Either semester may be taken for credit. 6 units. PROFESSOR HANNA AND ASSISTANT PROFESSOR WALLACE

262. TRADE UNIONISM AND COLLECTIVE BARGAINING.—An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. 3 units.† PROFESSOR DE VYVER

265. INTERNATIONAL TRADE AND FINANCE.—A study of the fundamental principles of international trade and foreign exchange. Subjects covered will include international specialization, balance of payments, foreign investments, tariffs and commercial policies, exchange control, exchange rates, and international monetary problems. 3 units.† ASSOCIATE PROFESSOR GERHARD

275-276. ADVANCED INDUSTRIAL ACCOUNTING AND MANAGEMENT.—A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices followed by job-order, process, and standard costing, as well as the economics of overhead costs. Prerequisites: Economics 171-172 and permission of the Department. 6 units.
PROFESSOR BLACK

301. ECONOMIC ANALYSIS.—Review of contemporary theory relating to consumer behavior, production, the firm, price formation, income distribution, and equilibrium. 3 units. ASSISTANT PROFESSOR DE ALESSI

304, 305. SEMINAR IN MONEY AND BANKING.—3 units each.
ASSOCIATE PROFESSOR YOHE

307. QUANTITATIVE ANALYSIS, I.—A systematic analysis of the principal quantitative methods used in microeconomic theory. Neo-classical theories of production and distribution are used as vehicles for presenting the material. Considerable emphasis is placed on the application of mathematical analysis to economic models. 3 units. PROFESSOR FERGUSON

308. QUANTITATIVE ANALYSIS, II.—Linear economic models, particularly

Leontief models, are used in the exposition. Primary emphasis is placed on the application of mathematics to economic theory. Prerequisite: Economics 307 or consent of instructor. 3 units. PROFESSOR FERGUSON

311-312. HISTORY OF POLITICAL ECONOMY.—A detailed review of the development of economic theory, the tools of economic analysis, and economics as a science, together with an analysis of the circumstances affecting this development. Period covered: pre-Christian times through 1936. 6 units. PROFESSOR SPENGLER

313-314. SEMINAR IN ECONOMIC THEORY.—The course consists of directed research in economic theory. The primary purpose is the correction of authoritative eclecticism and its replacement by individually integrated theory. Prerequisite: Economics 301 or its equivalent. 6 units. PROFESSORS HOOVER AND FERGUSON

315. SEMINAR IN ECONOMIC SYSTEMS.—3 units. PROFESSOR HOOVER

316. SEMINAR IN ECONOMIC FUNCTIONS OF THE STATE.—3 units. PROFESSOR HOOVER

317. SEMINAR IN DEMOGRAPHIC, POPULATION, AND RESOURCE PROBLEMS.—3 units. PROFESSOR SPENGLER

319. SEMINAR IN THE THEORY AND THE PROBLEMS OF ECONOMIC GROWTH AND CHANGE.—3 units. PROFESSOR SPENGLER

320. SEMINAR IN TRADE CYCLE, EMPLOYMENT, AND INCOME THEORY.—3 units. ASSOCIATE PROFESSOR YOHE

329. FEDERAL FINANCE.—A study of the expenditures, revenues, and financial administration of the government of the United States, with emphasis on current problems. Special attention given to budgetary procedure, corporate and individual income taxes, and the financial relations between federal and state governments. 3 units. ASSOCIATE PROFESSOR DAVIES

330. SEMINAR IN PUBLIC FINANCE.—3 units. ASSOCIATE PROFESSOR DAVIES

331. SEMINAR IN ECONOMIC HISTORY.—3 units. PROFESSOR SMITH

340. NATIONAL INCOME.—A critical survey of the conceptual framework and structure of national income and its components, the reliability of national income estimates, and their use in analyzing questions of economic policy. 3 units. PROFESSOR HANNAH

355. SEMINAR IN LABOR ECONOMICS.—3 units. PROFESSOR DE VYVER

358. SEMINAR IN LABOR MARKET AND RELATED ANALYSIS.—3 units. ASSOCIATE PROFESSOR GOODWIN

365. SEMINAR IN INTERNATIONAL TRADE—3 units.

366. SEMINAR IN PROBLEMS IN INTERNATIONAL TRADE AND FINANCE.—The seminar will discuss selected topics of current interest, such as the European Common Market, international commodity agreements, migration of labor, amending the IMF charter, and the U.S. gold drain. Prerequisite: Economics 365 or equivalent. 3 units. ASSOCIATE PROFESSOR GERHARD

386. SEMINAR IN LATIN-AMERICAN ECONOMIC PROBLEMS.—3 units. PROFESSOR SMITH

388. INDUSTRIAL ORGANIZATION.—The theory, measurement and history of the firm-structure of industry. Emphasis upon the structure of American industry and upon actual production and pricing practices. Criteria for evaluating industrial performance. 3 units. PROFESSOR MCGEE

389. SEMINAR IN INDUSTRIAL AND GOVERNMENTAL PROBLEMS.—3 units. PROFESSOR MCGEE

401. SEMINAR ON THE BRITISH COMMONWEALTH.—3 units. PROFESSORS SPENGLER, COLE, AND HAMILTON

RELATED COURSES IN OTHER DEPARTMENTS

Courses comprising a candidate's minor may be selected from fields of forestry, history, mathematics, philosophy, physics, political science, psychology, and sociology and anthropology, or from an area that complements the candidate's area of research interests in economics.

† Graduate students in Economics normally will not receive credit for courses so marked. These courses may be taken for credit by non-Economics graduate students, with the consent of the instructor.

# EDUCATION

PROFESSOR CARTWRIGHT, CHAIRMAN—08D WEST DUKE BUILDING; PROFESSOR BOLMEIER, DIRECTOR OF GRADUATE STUDIES—08D WEST DUKE BUILDING; PROFESSORS HOPKINS, HURLBURT AND STUMPF; ASSOCIATE PROFESSORS COLVER, GITHENS, GEHMAN, PETTY, RUDISILL, SHUMAN, AND WEITZ; ASSISTANT PROFESSORS MARTIN AND SUBLETT

FOR SENIORS AND GRADUATES

Graduate work in Education is offered leading to the A.M., the M.Ed., the M.A.T., and the Ed.D. degrees. For each of these degrees there are specific requirements and prerequisites, all of which may be found stated in detail in this *Bulletin*, pp. 31-39. Department requirements and prerequisites for all of these degrees may be obtained from the Director of Graduate Studies.

From the courses listed below, plus several in related disciplines, a selection may be made which will meet North Carolina requirements for the Advanced Principal's Certificate and the Superintendent's Certificate.

(Some courses below are offered only in the Summer Session; see the Summer Session *Bulletin*.)

**Accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.**

201. TEACHING AND SUPERVISION OF ARITHMETIC.—This course gives special attention to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. The course will consider the meaning theory, method of teaching, problem solving, evaluation, practice and drill, and selection and gradation of arithmetical contents. The course is designed for teachers and supervisors in the elementary school. 3 units.

ASSOCIATE PROFESSOR PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, and analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 3 units. PROFESSORS BOLMEIER, HURLBURT, AND STUMPF

204. THE SCHOOL AS AN INSTITUTION.—Consideration is given to the place of the school in the American social order, and its adaptation to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunity. 3 units. PROFESSOR BOLMEIER

205. CURRICULUM PROBLEMS IN SECONDARY EDUCATION.—A consideration of the aims and objectives of secondary-school subjects, emphasizing practical problems of curriculum-making in the high school. 3 units.*

PROFESSOR CARTWRIGHT

210. INTRODUCTION TO EDUCATIONAL RESEARCH.—The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an appreciation of the essential characteristics of good research. 3 units. PROFESSOR STUMPF

211. THE PROBLEM CHILD (also listed as Psychology S211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 3 units.

213. ELEMENTARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the elementary-school staff. The scope of elementary education is considered to encompass nursery school, kindergarten, and the elementary school. Special treatment is given to the problems of internal organization and management of the elementary school, and its integration with the secondary-school level. 3 units.* PROFESSOR STUMPF AND ASSISTANT PROFESSOR SUBLETT

215. SECONDARY EDUCATION: PRINCIPLES.—Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Must be accompanied by Education 216. 3 units.
PROFESSORS CARTWRIGHT, GITHENS, AND HURLBURT; ASSOCIATE PROFESSOR SHUMAN

216. SECONDARY EDUCATION: INTERNSHIP.—Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215; or, with permission of the Department, full-time teaching for a semester, accompanied by Education 315. Students carrying Education 216 for credit toward a master's degree will be required to take six hours of senior or graduate work in addition to the normal degree requirements. 6 units.
PROFESSORS CARTWRIGHT, GITHENS, AND HURLBURT; ASSOCIATE PROFESSOR SHUMAN

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 units.
ASSOCIATE PROFESSORS GEHMAN AND WEITZ

222. THE CURRICULUM AND MATERIALS OF THE ELEMENTARY GRADES.—A study of curriculum problems in the elementary schools. 3 units.*
PROFESSOR HURLBURT AND ASSISTANT PROFESSOR SUBLETT

224. TEACHING THE SOCIAL STUDIES IN ELEMENTARY SCHOOLS.—This course will treat objectives, curriculum trends, methods, and materials in elementary-school social studies. Topics to receive emphasis include unit-planning, use of the textbook, the reading program, using community resources, audio-visual materials, dealing with controversial issues, teaching time and place concepts, and evaluation. Opportunity will be provided for teachers to work on their own school problems in the social studies. 3 units. PROFESSOR CARTWRIGHT

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 3 units. PROFESSOR CARTWRIGHT

226. TEACHING READING IN THE ELEMENTARY SCHOOL.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. 3 units. ASSOCIATE PROFESSOR RUDISILL

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 units.
PROFESSOR CARTWRIGHT

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 units.* PROFESSOR HURLBURT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 units. PROFESSOR BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems guiding the reading of students. 3 units.
PROFESSOR CARTWRIGHT AND ASSISTANT PROFESSOR SUBLETT

236. TEACHING READING IN THE SECONDARY SCHOOL.—A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. The course provides practice with secondary-school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during a six-week period. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 units.
ASSOCIATE PROFESSOR RUDISILL

237. LITERATURE FOR ADOLESCENTS.—This course offers a critical survey

of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 units. ASSOCIATE PROFESSOR SHUMAN

238. REMEDIAL READING—PRINCIPLES AND PRACTICE.—A study of the basic causes of reading disability and of principles, methods, and materials for the diagnosis and correction of specific difficulties. The course provides practice with grade school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during the six-week period. A basic course in the psychology of teaching of reading is prerequisite, or Education 226 may be taken concurrently. 3 units. ASSOCIATE PROFESSOR RUDISILL

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar, and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 units.
PROFESSOR BOWMAN AND ASSOCIATE PROFESSOR SHUMAN

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 units.* ASSOCIATE PROFESSOR COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 units. ASSOCIATE PROFESSOR COLVER

242. MEASUREMENT OF APTITUDES, INTEREST, AND ACHIEVEMENT.—A study of the theories and principles of psychological measurement as applied to aptitude, interest, and achievement testing (also listed as Psychology 242). Prerequisite: 12 hours of psychology or educational psychology (6 hours of which may be taken concurrently). 3 units.

243. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 units.
ASSOCIATE PROFESSOR GEHMAN

244. COUNSELING TECHNIQUES.—A study of individual counseling techniques including diagnosis, interviewing, program planning, and counseling evaluation. Prerequisites: Education 242 and 243 or equivalent, which may be taken concurrently. 3 units. ASSOCIATE PROFESSOR GEHMAN

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 units. ASSOCIATE PROFESSOR REYNOLDS

248. PRACTICUM IN COUNSELING.—Practice in individual counseling, including test administration, intake interviewing, diagnosis, counseling, program planning, report preparation, and evaluation. The student will be expected to devote about 150 hours to case work and conferences with his supervisor. Prerequisite: Education 244. 3 units. ASSOCIATE PROFESSOR WEITZ

253. SCHOOL LAW.—The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 units. PROFESSOR BOLMEIER

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education, with opportunity for individual

research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 3 units. ASSOCIATE PROFESSORS COLVER AND WEITZ

256. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 units.* PROFESSOR GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 units. PROFESSOR GITHENS

285. AUDIO-VISUAL AIDS IN EDUCATION.—The aims and psychological bases of audio-visual materials in the classroom. Attention to such materials as charts, filmstrips, flat pictures, maps, models, motion pictures, radio, records, slides, and television. 3 units.*

290. ADMINISTRATION OF SCHOOL PROPERTY.—Planning and management of the school plant and its equipment to meet instructional, health, and community needs for immediate and long-range purposes. This course is intended for teachers, principals, and superintendents. Areas to be treated will include site selection; trends in design, lighting, ventilation, and heating; custodial service and maintenance; and financing. 3 units.* PROFESSOR STUMPF

291. PUBLIC AND COMMUNITY RELATIONS OF SCHOOLS.—A study of the relationships between the entire school or school system and the several publics, especially to the community of a given school. Media for interpreting needs and views of the school to the public and vice-versa will be explored. The study applies to both public and private schools. 3 units. PROFESSOR STUMPF

FOR GRADUATES

315. SEMINAR IN SECONDARY-SCHOOL TEACHING.—Advanced-level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216. 3 units.
PROFESSOR HURLBURT

323. PUBLIC SCHOOL FINANCE.—A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 3 units.* PROFESSOR STUMPF

333. SEMINAR IN HIGHER EDUCATION.—An examination of current problems in American higher education, with special emphasis on case studies in organization, administration, and evaluation. For graduate students interested in the administration of higher education or college teaching with consent of the instructor. 3 units. PROFESSOR HOPKINS AND ASSISTANT PROFESSOR MARTIN

335-336. SEMINAR IN SCHOOL ADMINISTRATION.—Organization and control over public education. During the first semester special attention is given to "external control" such as is exercised by various branches and levels of government and by professional and lay groups. "Internal control" as this relates to the principal, the teaching staff, and methods of classroom control, is considered in the second semester. 6 units each semester.
PROFESSORS BOLMEIER, HURLBURT, AND STUMPF; ASSOCIATE PROFESSOR PETTY

350, 351. DIRECTED ACTIVITIES IN SCHOOL ADMINISTRATION.—This course will satisfy, in part, requirements for the Superintendent's or Advanced Principal's Certificate. It involves work on an administrative project approved and supervised by the instructor. Open only to school administrators. 3 or 6 units.
PROFESSORS BOLMEIER, HURLBURT, AND STUMPF; ASSOCIATE PROFESSOR PETTY

354. SEMINAR IN SCHOOL LAW.—Open to students who have completed Education 253 or its equivalent and are working or plan to work on doctoral dissertations or masters' theses of a legal nature. Reports on research projects and recent court cases. 3 units.* PROFESSOR BOLMEIER

# ENGINEERING

## CIVIL ENGINEERING

PROFESSOR BROWN, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—121 ENGINEERING; PROFESSORS MERIAM AND WILLIAMS; ASSOCIATE PROFESSOR BRYAN; VISITING ASSOCIATE PROFESSOR KUMAR; ASSISTANT PROFESSORS HILL AND WOOD

The Department of Civil Engineering offers graduate work leading to the Master of Science degree. A broad approach is emphasized and fundamental principles are stressed. Narrowly specialized courses are not offered. Each graduate student, therefore, engages in a program that is designed to give him technical competence in the sciences related to his field of study, and to give him an understanding of the art of engineering, which depends on imagination and judgment. A student may specialize in one of the following fields of study: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soils engineering or structural engineering.

For requirements of the M.S. degree, see page 31.

A student majoring in sanitary engineering may include in his related work 3 units in the Department of Sanitary Engineering at the University of North Carolina. The minor work will normally be taken in the Departments of Mathematics, and either Chemistry or Physics. A student whose major interest relates to the biological or social sciences may take minor work in these areas. Each graduate student participates in departmental seminars appropriate to his field of study. There is no language requirement for the M.S. degree.

A Bachelor's degree from an accredited engineering college, and study including mathematics through linear differential equations, mechanics of materials, solid and fluid mechanics, are prerequisite for admission to the graduate program.

CE 202. EXPERIMENTAL STRESS ANALYSIS.—The analysis of stress and strain in deformable bodies, correlation of theory with data from experiment; photoelasticity; strain gauges; similitude. 3 units.
PROFESSOR MERIAM AND VISITING ASSOCIATE PROFESSOR KUMAR

CE 203. ADVANCED MECHANICS OF MATERIALS.—Analysis of structural elements described by ordinary differential equations such as beams on an elastic foundation, circular plates; applications to elementary problems of plates and shells. Introduction to elasticity and plasticity. Energy methods in elasticity. 3 units. ASSOCIATE PROFESSOR GARDNER AND ASSISTANT PROFESSOR HILL

CE 204. THEORY OF PLATES AND SHELLS.—Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 203 or equivalent. 3 units. ASSISTANT PROFESSOR HILL

CE 205. THEORY OF ELASTICITY.—Linear theory of elasticity; solutions of two dimensional problems; three dimensional problems of torsion and bending; elastic wave propagation; energy principles. Prerequisite: CE 203 or equivalent. 3 units. PROFESSOR MERIAM AND ASSISTANT PROFESSOR HILL

CE 211. BEHAVIOR OF MATERIALS.—Macroscopic mechanical properties of materials for static, fatigue, dynamic, and creep conditions; lower and high temperature properties; applications. 3 units. VISITING ASSOCIATE PROFESSOR KUMAR

CE 231. STRUCTURAL THEORY AND ANALYSIS.—The application of the fundamental theories of structural action to the design and analysis of structural members. The Gauss Scheme. Specifications. Planning of CE projects. 3 units.
PROFESSOR BROWN

CE 232. REINFORCED CONCRETE THEORY.—Design and analysis of reinforced concrete members including plates and shells. Prestressed and poststressed concrete members. 3 units.* PROFESSOR BROWN

CE 235. FOUNDATION ENGINEERING.—The theory and application of soil mechanics to the design and analysis of foundations, subsurface structures, and earth works. 3 units. STAFF

CE 242. HYDRAULIC ENGINEERING.—Fundamental principles of flow, effects

of gravity, viscosity, compressibility, and surface tension of fluid motion in closed conduits and open channels; surface and form resistance; hydraulic similitude. Fundamentals of applied hydrology. 3 units.* ASSISTANT PROFESSOR WOOD

CE 244. SANITARY ENGINEERING PROCESSES.—Fundamental bases for design of water and waste treatment systems, including: transport, mixing, sedimentation and filtration; gas transfer, coagulation, and bio-treatment processes. 3 units. ASSOCIATE PROFESSOR BRYAN

CE 250. ENGINEERING ANALYSIS.—General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical techniques; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and non-uniform properties and with rigid and non-rigid supports. 3 units. ASSISTANT PROFESSOR WOOD

CE 265. ADVANCED TOPICS IN CIVIL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the Civil Engineering Department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

CE 297, 298. THESIS RESEARCH.—A student with the proper background may carry on research under the direction of the staff in one of the following fields: engineering mechanics; foundation engineering; hydraulic engineering; structural engineering; or sanitary engineering. Thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF

## ELECTRICAL ENGINEERING

PROFESSOR VAIL, CHAIRMAN—131 ENGINEERING; ASSOCIATE PROFESSOR OWEN, DIRECTOR OF GRADUATE STUDIES—108A ENGINEERING; PROFESSORS MEIER AND WILSON; ASSOCIATE PROFESSORS ARTLEY AND KOEPSEL; ADJUNCT ASSOCIATE PROFESSOR BURGER; ASSISTANT PROFESSOR PILKINGTON

The Department of Electrical Engineering offers graduate work leading to the M.S. and Ph.D. degrees. The program is designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, and an understanding of the art of engineering, which depends on human imagination and judgment. Students may specialize in any of the following fields: solid-state materials and devices, ferromagnetics, superconducting circuits, instrumentation, electronics, microwaves, computers and automatic control, and information processing. Major credit in electrical engineering may be given for graduate level physics courses in the area of microwaves.

For requirements of the M.S. degree, see page 31.

The minimum requirements for the Ph.D. degree include: 48 units of course credits (normally 24 in electrical engineering and 24 in mathematics and physics or chemistry), a reading knowledge of two foreign languages (normally French and German), and an acceptable research-based dissertation.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.

EE 201. ENERGY SYSTEMS.—Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units.
ASSOCIATE PROFESSOR ARTLEY

EE 203, 204. INFORMATION SYSTEMS.—General concepts of information storage, transfer, and processing: information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units.
ASSOCIATE PROFESSOR OWEN

EE 207. NETWORK SYNTHESIS.—Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units.
PROFESSOR VAIL AND ASSOCIATE PROFESSORS KOEPSEL AND OWEN

EE 211. SOLID STATE THEORY.—The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units.
PROFESSOR VAIL, ASSOCIATE PROFESSORS ARTLEY AND BURGER, ASSISTANT PROFESSOR PILKINGTON

EE 212. SOLID STATE MATERIALS.—Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units.
PROFESSOR VAIL, ASSOCIATE PROFESSORS ARTLEY AND BURGER, ASSISTANT PROFESSOR PILKINGTON

EE 213. MAGNETICS.—A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units.* PROFESSOR WILSON AND ASSOCIATE PROFESSOR ARTLEY

EE 215, 216. SOLID-STATE DEVICES.—Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: permission of instructor. 6 units.* ASSOCIATE PROFESSOR BURGER AND ASSISTANT PROFESSOR PILKINGTON

EE 221. NONLINEAR ELECTROMAGNETICS.—Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON

EE 222. NONLINEAR ANALYSIS.—Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON

EE 231. NUCLEAR ENGINEERING.—Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units.* PROFESSOR MEIER

EE 241. FEEDBACK CONTROL SYSTEMS.—Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral error criteria; nonstationary and nonlinear systems. Prerequisite: permission of instructor. 3 units.
PROFESSOR WILSON AND ASSOCIATE PROFESSOR KOEPSEL

EE 242. OPTIMUM CONTROL SYSTEMS.—Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; computer applications in control. Prerequisite: permission of instructor. 3 units. ASSOCIATE PROFESSOR KOEPSEL

EE 243. NONLINEAR CONTROL SYSTEMS.—Analysis and design of nonlinear feedback control systems; approximations for small and large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. PROFESSOR WILSON AND ASSOCIATE PROFESSOR KOEPSEL

EE 259. ADVANCED ELECTRIC ENERGY CONVERSION.—Equations of motion of electromechanical systems; fields and lumped parameters; state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructors. 3 units.*
PROFESSORS MEIER AND WILSON

EE 265. ADVANCED TOPICS IN ELECTRICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units.* MEMBERS OF THE GRADUATE STAFF

EE 297, 298. THESIS RESEARCH.—A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF

EE 399. SPECIAL READINGS IN ELECTRICAL ENGINEERING.—Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 2 or 3 units.*
MEMBERS OF THE GRADUATE STAFF

## MECHANICAL ENGINEERING

PROFESSOR MACDUFF, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—142A ENGINEERING; PROFESSORS KENYON AND MERIAM; ASSOCIATE PROFESSORS ELSEVIER AND BOYLE; ASSISTANT PROFESSOR HARMAN

The Mechanical Engineering Department offers graduate work leading to the degree of Master of Science. It is intended that the work for this degree provide a broad basic foundation in the art of applying science to mechanical design and analysis.

For requirements of the M.S. degree, see pag 31.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

ME 201. THEORETICAL AND APPLIED MECHANICS.—Introduction to the theory of elasticity, vibration analysis, and hydrodynamics. 3 units.
PROFESSORS MACDUFF AND MERIAM

ME 202. THEORETICAL THERMODYNAMICS.—Classical and modern concepts of the conversion of heat and work; the combined First and Second Law; thermo-electricity; super-critical pressure systems; reheat and regenerative processes; binary-vapor systems; introduction to unsteady systems. 3 units.
ASSOCIATE PROFESSOR ELSEVIER AND ASSISTANT PROFESSOR HARMAN

ME 221. ANALYSIS OF INCOMPRESSIBLE AND COMPRESSIBLE FLUID FLOW.—Flow of incompressible and compressible fluids; analysis of subsonic, transonic, supersonic, and hypersonic flow of fluids; potential flow, turbulence, experimental methods. 3 units.* ASSISTANT PROFESSOR HARMAN

ME 222. ANALYSIS OF HEAT TRANSFER.—Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units.* PROFESSOR KENYON

ME 231-232. SYSTEMS ENGINEERING.—Methods of obtaining parameters for strength, response, and stability studies of mechanical systems; impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. PROFESSOR MACDUFF

ME 265. ADVANCED TOPICS IN MECHANICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisites: Approval of the Director of Graduate Studies and the instructor under whom work will be done. 1 to 3 units. MEMBERS OF THE GRADUATE STAFF

ME 280. NUCLEAR REACTOR POWER CYCLES.—Introduction to basic reactor principles and reactor types; consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants; analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques; metallurgical problems peculiar to reactor design. 3 units.*
PROFESSOR KENYON

ME 297, 298. THESIS RESEARCH.—A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 units. MEMBERS OF THE GRADUATE STAFF

## ENGLISH

PROFESSOR TURNER, CHAIRMAN—325 ALLEN BUILDING; PROFESSOR NYGARD, DIRECTOR OF GRADUATE STUDIES—502 LIBRARY; PROFESSORS BEVINGTON, BOYCE, DUFFEY, GHODES, LIEVSAY, LUMIANSKY, SANDERS, STEVENSON, AND WARD; ASSOCIATE PROFESSORS BUDD, FERGUSON, HENINGER, SMITH, AND WILLIAMS

The department offers graduate work leading to the A.M. and Ph.D. degrees. A statement of the requirements for the Ph.D. degree may be obtained from the Director of Graduate Studies.

FOR SENIORS AND GRADUATES

203. CHAUCER.—Reading and interpretation of the minor poems, *Troilus*, and *The Canterbury Tales*. 3 units. PROFESSORS LUMIANSKY AND NYGARD

207. OLD ENGLISH GRAMMAR AND READINGS.—3 units.
PROFESSORS LUMIANSKY AND NYGARD

208. HISTORY OF THE ENGLISH LANGUAGE.—A survey of the language from Old to Present English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 3 units.
PROFESSORS LUMIANSKY AND NYGARD

209. PRESENT-DAY ENGLISH.—A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage; and the application of language-study to composition. 3 units.
PROFESSOR NYGARD

213. INTRODUCTION TO FOLKLORE.—A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 units.

215, 216. ELIZABETHAN DRAMA.—6 units. (Not 1964-65) PROFESSOR LIEVSAY

217. MILTON.—Milton's poetry and prose, with emphasis on the major poems. 3 units. PROFESSOR LIEVSAY

218. SPENSER.—A study of his works. 3 units. (Not 1964-65)
ASSOCIATE PROFESSOR HENINGER

219, 220. THE EIGHTEENTH CENTURY.—Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson, Boswell, Collins, Goldsmith, the novelists, and other writers. 6 units.
PROFESSOR BOYCE, ASSOCIATE PROFESSOR FERGUSON

221, 222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Lamb, Hazlitt, and other writers. 6 units. PROFESSORS BEVINGTON, SANDERS, STEVENSON

223, 224. ENGLISH LITERATURE OF THE LATER NINETEENTH CEN-

TURY.—The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 units.

PROFESSORS BEVINGTON, SANDERS, STEVENSON

227. LITERARY CRITICISM.—A study of the Greek and Roman critics, in chronological order but with emphasis on their permanent value rather than on the mere history; also of the Continental and English critics to about 1700. 3 units.

PROFESSOR LIEVSAY

229, 230. AMERICAN LITERATURE, 1800-1865.—The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 units. PROFESSOR TURNER, ASSOCIATE PROFESSOR BUDD

233, 234. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors of the period. The first semester will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists; the second semester, Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 units. PROFESSOR GHODES

235, 236. AMERICAN LITERATURE SINCE 1920.—First semester, selected fiction from Sherwood Anderson to the present and the Imagist movement in poetry. Second semester, later poetry and consideration of recent drama. 6 units.

PROFESSOR DUFFEY

237. ENGLISH DRAMA, 1642-1800.—The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 units. (Not 1964-65) PROFESSOR WARD

239. SHAKESPEARE.—The plays and poems. 3 units.

ASSOCIATE PROFESSOR WILLIAMS

244. LITERARY BIOGRAPHY.—Reading and discussion of works by Plutarch, Roper, Walton, Aubrey, Mason, Johnson, Boswell, Lockhart, Carlyle, Froude, Gosse, and Strachey: the development of the literary form, its various methods, various theories of its nature and purpose. 3 units. PROFESSOR SANDERS

251, 252. ENGLISH LITERATURE OF THE SEVENTEENTH CENTURY.—Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 units.

PROFESSOR WARD

261, 262. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 units.

ASSOCIATE PROFESSOR SMITH

264. MAJOR DEVELOPMENTS IN CONTEMPORARY AMERICAN POETRY.—The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Crane, the "Fugitives," and a selection from the poets of the present generation. 3 units. (Not 1964-65)

266. RECENT CRITICAL THOUGHT.—Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 units.

PROFESSOR DUFFEY

269, 270. SOUTHERN LITERATURE.—The principal authors and the chief literary development from the beginning to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 units. PROFESSOR TURNER

274. AMERICAN HUMOR.—The development of the native tradition in the Down-East humorists and the humorists of the Old Southwest. Extensive reading in Mark Twain and his contemporaries, and some attention to the continuation of the tradition after Mark Twain. 3 units. (Not 1964-65) PROFESSOR TURNER

277. ENGLISH PROSE OF THE SIXTEENTH CENTURY.—Readings in the major forms and authors. 3 units.

278. ENGLISH NON-DRAMATIC POETRY OF THE SIXTEENTH CENTURY.—Extensive select readings from representative types and authors, excluding Spenser. 3 units.

FOR GRADUATES

304. STUDIES IN THE METAPHYSICAL POETS.—A careful study of Donne, Herbert, and Vaughan against the seventeenth-century background, with some attention to their influence on other writers in the period and their impact on twentieth-century poetry. 3 units. (Not 1964-65) PROFESSOR LIEVSAY

306. STUDIES IN CHAUCER.—Cultural background, sources, themes, structures; special attention to *Troilus* and the dream-vision poems. 3 units.

311. BEOWULF.—Reading and interpretation of the text. 3 units.
PROFESSORS LUMIANSKY AND NYGARD

313. THE TRADITIONAL BALLAD AND FOLKSONG.—A survey of English, Scottish, and American popular poetry, with attention to the textual and musical traditions. (No technical knowledge of music is required.) 3 units. (Not 1964-65)
PROFESSOR NYGARD

315. MIDDLE ENGLISH LITERATURE.—The literature of England from 1100 to 1500 (excluding Chaucer); a study of medieval genres with a close reading of selected major works. 3 units. PROFESSORS LUMIANSKY AND NYGARD

320. MEDIEVAL ROMANCES.—Origins, types, forms, themes; special attention to Arthurian materials. 3 units.

322. GENRE STUDIES IN TWENTIETH-CENTURY AMERICAN LITERATURE.—Formal and thematic problems posed by the fiction, poetry or drama of this century. 3 units. PROFESSORS DUFFEY AND GOHDES

330. TEXTUAL CRITICISM.—The principles of analytical bibliography and their application to problems and procedures in the study of Elizabethan printed books. 3 units. ASSOCIATE PROFESSOR WILLIAMS

331. EMERSON.—A study of Emerson's ideas as reflected in selected examples of his essays and poems. 3 units. (Not 1964-65) PROFESSOR GOHDES

332. WHITMAN.—A detailed study of *Leaves of Grass* and of selected prose works. 3 units. (Not 1964-65) PROFESSOR GOHDES

333. HAWTHORNE AND MELVILLE.—Extensive reading in the works of Hawthorne and Melville, and close study of selected writings. 3 units. (Not 1964-65)
PROFESSOR TURNER

334. STUDIES IN THE CRITICAL AND PHILOSOPHICAL IDEAS OF COLERIDGE AND CARLYLE.—3 units. PROFESSOR SANDERS

339. STUDIES IN SHAKESPEARE.—Intensive study of carefully limited topics, together with critical analysis and interpretation of selected texts. 3 units. (Not 1964-65)

340. STUDIES IN RENAISSANCE ENGLISH PROSE.—Close readings in various forms and authors as they reflect the culture and thought of the Renaissance. 3 units.

345. THE EIGHTEENTH-CENTURY NOVEL.—Richardson, Fielding, Smollett, and Sterne are emphasized. Attention is given to earlier prose fiction and to other contributing literary patterns. 3 units. PROFESSOR BOYCE

347. STUDIES IN VICTORIAN POETRY.—Analysis of themes, forms, and sources in the works of Tennyson, Browning, Arnold, Rossetti, Swinburne, Meredith, Hardy, and Hopkins. 3 units. (1964-65) PROFESSOR STEVENSON

348. STUDIES IN VICTORIAN FICTION.—Techniques and principal types of material in the novels of Dickens, Thackeray, Trollope, Eliot, Meredith, and Hardy. 3 units. (Not 1964-65) PROFESSOR STEVENSON

351, 352. INTRODUCTION TO RESEARCH.—6 units.
MEMBERS OF THE GRADUATE STAFF

363. STUDIES IN BRITISH POETRY OF THE TWENTIETH CENTURY.—Detailed examination of major poetic texts, with background readings in prose. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR SMITH

378. SAMUEL JOHNSON'S LITERARY CRITICISM AND RELATED TOPICS. —3 units. (Not 1964-65) PROFESSOR BOYCE

ENGLISH FOR FOREIGN STUDENTS.—A non-credit semester course in English for foreign students. Restricted to registered undergraduate and graduate foreign students and, to capacity, to employees and wives of foreign students. Without fee for registered students who are permitted an audit without fee; otherwise a $5.00 fee.

## FORESTRY

PROFESSOR HARRAR, CHAIRMAN, 213 BIOLOGICAL SCIENCES BUILDING; PROFESSOR YOHO, DIRECTOR OF GRADUATE STUDIES, 104 BIOLOGICAL SCIENCES BUILDING; PROFESSORS ANDERSON, KRAMER, NAYLOR, AND OSBORNE; ASSOCIATE PROFESSORS JOHNSON AND RALSTON; ASSISTANT PROFESSORS KNOERR, STAMBAUGH, SULLIVAN, AND WOODS

Major and minor work is offered in the scientific aspects of forestry leading to the Master of Arts and Doctor of Philosophy degrees. Work for these degrees may be pursued in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest mensuration and biometry, forest entomology, forest economics, and forest climatology and hydrology. College graduates who have had specialized training in botany or soil science and in allied basic subjects, such as physics, chemistry, geology, and zoology, may pursue graduate study and research only in the specialized fields for which their previous work has qualified them. For information on professional training in forestry, see Bulletin of the School of Forestry. For detailed information concerning admission to the Graduate School and for regulations governing candidacy for the A.M. and Ph.D. degrees and for other regulations, consult the proper pages in this Bulletin.

FOR SENIORS AND GRADUATES

223. FOREST PATHOLOGY.—Infectious and non-infectious diseases of forest trees, and related deterioration of forest products. Field and laboratory study of symptoms, etiology, and control. Prerequisites: Botany 1 and 2, or equivalent. 3 units. ASSISTANT PROFESSOR STAMBAUGH

230. FOREST ENTOMOLOGY.—Morphology, general classification, life histories, and control of insects injurious to forest trees, logs, and lumber. 3 units. PROFESSOR ANDERSON

241. DENDROLOGY.—Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisites: one year of biology or permission of instructor. 2 units. PROFESSOR HARRAR

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Desirable prerequisites: plant physiology, plant ecology, and Forestry 261, or equivalent. 3 units. (Summer only) ASSISTANT PROFESSOR WOODS

251. SAMPLING METHODS IN FORESTRY.—Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 units.* PROFESSOR OSBORNE

257. DESIGN OF FORESTRY EXPERIMENTS AND ANALYSIS OF DATA.—Role of experimental design in field and laboratory, and statistical analysis of data as aspects of scientific method in forest research. 5 units.* PROFESSOR OSBORNE

261. FOREST SOILS.—Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalents; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 units. ASSOCIATE PROFESSOR RALSTON

270. ECONOMICS OF FORESTRY.—Development of the principles of economics

useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry, basic and peculiar to forestry, with special attention to the time dimensions of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 units. PROFESSOR YOHO

276. FORESTRY POLICY.—Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public and private forestry organizations, and current policy issues in the light of economic and other criteria. 2 units. PROFESSOR YOHO

290. WOOD ANATOMY.—Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Elementary microtechnique. Prerequisites: one year of biology, Forestry 241 or equivalent. 3 units.
PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

FOR GRADUATES

301, 302. ADVANCED STUDIES IN FORESTRY.—To meet individual needs of graduate students in the following branches of forestry: (a) Silvics, (b) Forest Soils, (e) Forest Economics, (f) Properties of Wood, (g) Forest Mensuration and Biometry, (h) Forest Entomology, (k) Forest-tree Physiology, (l) Forest Pathology, (m) Forest Climatology and Hydrology.
ALL MEMBERS OF THE GRADUATE SCHOOL STAFF

321. RESEARCH TECHNIQUES IN FOREST PATHOLOGY.—Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223 or equivalent. 3 units. ASSISTANT PROFESSOR STAMBAUGH

331. TOXICOLOGY OF INSECTICIDES.—Study of the physical, chemical, and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisites: one course in entomology; organic chemistry is recommended. 3 units.
PROFESSOR ANDERSON

332. ECOLOGY OF FOREST INSECTS.—Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 units. PROFESSOR ANDERSON

341. FOREST METEOROLOGY.—The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 units.
ASSISTANT PROFESSOR KNOERR

342. FOREST INFLUENCES.—The influence of forests and other vegetation on local climate, the hydrolic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 units. ASSISTANT PROFESSOR KNOERR

344. MICROMETEOROLOGY.—Physics of the earth's surface environment with emphasis on plant and animal microclimates: budgets of mass, momentum and energy; vertical structure of wind, temperature, water vapor and carbon-dioxide in relation to exchange processes within the biosphere; local circulation and eddy diffusion; principles of micrometeorological measurement. Prerequisite: Forestry 341, calculus desirable. 3 units. ASSISTANT PROFESSOR KNOERR

348. SEMINAR IN SILVICS.—Advanced topics in silvics are discussed and current research papers and reports are reviewed, analyzed, and evaluated. 2 units.
ASSISTANT PROFESSOR WOODS

352. ANALYSIS OF FOREST MEASUREMENTS.—Empirical equations and curve-fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisite: Forestry 251. 3 units.
PROFESSOR OSBORNE

357, 358. RESEARCH IN FORESTRY.—Credits to be arranged. Students who have had adequate training may do research under direction of members of the Faculty in the following branches of forestry:

a. SILVICS.—Prerequisites: Forestry 241, 243, and 244, or equivalents.
ASSISTANT PROFESSOR WOODS

b. FOREST SOILS.—Prerequisite: Forestry 261 or equivalent.
ASSOCIATE PROFESSOR RALSTON

e. FOREST ECONOMICS.—Prerequisite: Forestry 270 or equivalent.
PROFESSOR YOHO

f. PROPERTIES OF WOOD.—Prerequisites: Forestry 259 and 260, or equivalents. PROFESSOR HARRAR AND ASSISTANT PROFESSOR SULLIVAN

g. FOREST MENSURATION AND BIOMETRY.—Prerequisites: Forestry 151, 251, and 252, or equivalents. PROFESSOR OSBORNE

h. FOREST ENTOMOLOGY.—Prerequisite: Forestry 230 or equivalent.
PROFESSOR ANDERSON

k. PHYSIOLOGY OF FOREST TREES.—Prerequisites: Plant physiology and plant ecology or silvics. PROFESSOR KRAMER

l. FOREST PATHOLOGY.—Prerequisites: Plant physiology and Forestry 223 or equivalent. ASSISTANR PROFESSOR STAMBAUGH

m. FOREST CLIMATOLOGY AND HYDROLOGY.—Prerequisite: Forestry 341, 342, or equivalents. ASSISTANT PROFESSOR KNOERR

353. SAMPLING AND EXPERIMENTAL DESIGN IN FORESTRY.—Theory and application of selected sampling designs to forestry populations. Includes multi-stage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Mathematics 234 (Sample Designs) and 244 (Design of Experiments). 3 units. PROFESSOR OSBORNE

362. FOREST SOIL PHYSICS.—Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR RALSTON

366. FOREST SOIL FERTILITY.—The relationships of soil fertility factors in the growth of forest trees. Emphasis is placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisites: Forestry 262 with analytical chemistry recommended. 3 units. (1964-65) ASSOCIATE PROFESSOR RALSTON

378. SEMINAR IN FOREST ECONOMICS.—Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 units. PROFESSOR YOHO

379. ECONOMIC ANALYSIS IN FORESTRY.—Principles of economics of particular value to problems of resource allocation and efficiency in private forest management based on a static and dynamic firm theory approach, linear programming and activity analysis. Development of production principles applicable to forestry problems in use of land, labor, and capital; resource and production combinations; production location and timing; cost structure and asset control; uncertainty and expectations. Prerequisites: Forestry 270 or consent of instructor. 3 units. PROFESSOR YOHO

396. CHEMISTRY OF WOOD.—A study of the chemical constituents of wood including cellulose and its derivatives, lignin and the lignin-cellulose bond, the hemicelluloses, and the extractives; hydrogenation and hydrolysis of wood; cell wall chemistry. Prerequisites: Forestry 290 or equivalent, one course in college physics; organic chemistry desirable. 2 units. ASSISTANT PROFESSOR SULLIVAN

397. TIMBER PHYSICS.—The physical properties of wood in relation to electricity, heat, light, moisture, and sound; the mechanical properties of wood; influence of site, growth, and anatomy upon strength and quality of wood; standard

timber testing procedures. Prerequisites: Forestry 290 or equivalent, one course in college physics, mathematics through calculus desirable. 2 units.

ASSISTANT PROFESSOR SULLIVAN

## GEOLOGY

PROFESSOR BERRY, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES, 019 SCIENCE BUILDING; ASSOCIATE PROFESSORS DU BAR AND HERON

The Department of Geology offers graduate work leading to the A.M. degree. An undergraduate degree in geology is not a prerequisite for graduate studies, but a student must have had or must take the equivalent of Geology 103, 108, 143, 152 and 166. In addition he must have had one year of college chemistry, one year of college physics, and mathematics through calculus.

Graduate courses in the Department of Geology are designed to provide training in the field of environmental sedimentary geology with specialized training in bio-environments, litho-environments, or modern environments.

An acceptable thesis is necessary for the fulfilment of the A.M. requirements.

FOR SENIORS AND GRADUATES

203. ADVANCED STRATIGRAPHY.—A survey of the Phanerozoic deposits of the world with special emphasis on type areas. 3 units.

ASSOCIATE PROFESSOR DU BAR

206. GEOLOGY OF THE OCEANS.—Introduction to marine geology and oceanography. 3 units.

207. SEDIMENTATION.—Sedimentary processes and principles. 3 units.

ASSOCIATE PROFESSOR HERON

222. SEDIMENTARY MINERALS.—Major detrital and authigenic minerals with emphasis on the clay minerals. 3 units. ASSOCIATE PROFESSOR HERON

234. MARINE GEOLOGY.—Ocean-floor topography, sediment transport and deposition. 3 units.

FOR GRADUATES

305. PHYSICAL ENVIRONMENTS SEMINAR.—3 units.

306. BIO-ENVIRONMENTS SEMINAR.—3 units. ASSOCIATE PROFESSOR DU BAR

371, 372. ADVANCED TOPICS IN GEOLOGY.—To meet the individual needs of graduate students for independent study in the various environmental sedimentary fields. 1 to 3 units. ALL MEMBERS OF THE GRADUATE STAFF

RELATED COURSES IN OTHER DEPARTMENTS

Courses comprising a candidate's minor may be selected from the fields of zoology, physics, mathematics, chemistry, or approved courses offered in the Department of Geology at the University of North Carolina at Chapel Hill (see page 22 of this Bulletin).

## GERMANIC LANGUAGES AND LITERATURE

PROFESSOR SALINGER, CHAIRMAN AND DIRECTOR OF GRADUATE STUDIES—106 OLD LAW; ASSOCIATE PROFESSORS PHELPS, SEYMOUR AND WILLSON; ASSISTANT PROFESSOR DEINERT

The Department of Germanic Languages and Literature offers graduate work leading to the A.M. degree. Students who expect to major in German should have had sufficient undergraduate courses in Germanic languages to enable them to proceed to more advanced work.

Students who wish to take courses in German for a minor should normally have completed a third-year course (in exceptional cases, a second-year) of college German with acceptable grades.

201, 202. GOETHE.—A study of his life and works, in the light of his lasting significance to world literature. 6 units. (1964-65) PROFESSOR SALINGER

203, 204. EIGHTEENTH CENTURY.—Eighteenth-century German literature in its relation to contemporary European philosophy. 6 units.*

ASSOCIATE PROFESSOR PHELPS

205, 206. MIDDLE HIGH GERMAN.—The language and literature of Germany's first classical period. 6 units.* ASSOCIATE PROFESSOR SEYMOUR

207, 208. GERMAN ROMANTICISM.—The course covers the entire field of German Romanticism from 1800 to 1850. 6 units. (Not 1964-65) ASSOCIATE PROFESSOR WILLSON

209, 210. KLEIST, GRILLPARZER, AND HEBBEL.—The development of the drama in Germany and Austria between Schiller and naturalism. 6 units.* PROFESSOR SALINGER AND ASSOCIATE PROFESSORS WILLSON

211, 212. HEINRICH HEINE.—A study of the German poet and his immediate successors in the movement known as *Jungdeutschland*. 6 units. (Not 1964-65) PROFESSOR SALINGER

213. NINETEENTH-CENTURY LITERATURE.—From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm, and Fontane. 3 units. (1964-65) ASSISTANT PROFESSOR DEINERT

214. THE TWENTIETH CENTURY.—From Naturalism to the present, with emphasis on Hauptmann, Hofmannstal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht, and Benn. 3 units. (1964-65) ASSISTANT PROFESSOR DEINERT

215. SEVENTEENTH-CENTURY LITERATURE.—A study of the leading writers of the Baroque, seen against the background of their time. 3 units. (Not 1964-65) ASSISTANT PROFESSOR DEINERT

216. HISTORY OF THE GERMAN LANGUAGE.—The development of the phonology, morphology, and syntax of German from earliest beginnings to the present. 3 units.* ASSOCIATE PROFESSOR SEYMOUR

218. THE TEACHING OF GERMAN.—Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 units.* ASSOCIATE PROFESSOR PHELPS

—.GRADUATE READING COURSE. An intensive course in German to develop rapidly the ability to read German in several fields. Graduate students only. No credit. ASSOCIATE PROFESSOR SEYMOUR

RELATED COURSES IN OTHER DEPARTMENTS

The following courses in other departments are recommended to students who are majoring in Germanics, as particularly valuable in building a proper background for Germanic studies:

(a) Graduate courses in literature or philology, offered by the ancient and modern language departments, to be selected after consultation with the Germanic Department.

(b) Graduate courses in history and philosophy, offered by those departments, to be selected after consultation with the Germanic Department.

## HISTORY

PROFESSOR WATSON, CHAIRMAN—235 ALLEN; PROFESSOR PARKER, DIRECTOR OF GRADUATE STUDIES—232 ALLEN; PROFESSORS ALDEN, COLTON, CRANE, CURTISS, FERGUSON, HAMILTON, HOLLEY, LANNING, MANCHESTER, NELSON, ROGERS, ROPP, AND WOODY; ASSOCIATE PROFESSORS ACOMB, DURDEN, HOLLYDAY, SCOTT, AND YOUNG; ASSISTANT PROFESSORS DAVIS, GILLIN, AND LERNER

A candidate for the degree of Doctor of Philosophy is required to prepare himself for examination in five fields, of which four shall normally be within history and of which one must be in American history or in the history of Western Europe. The choice and delimitation of fields is determined in consultation with his supervisor and the Director of Graduate Studies. The Department offers graduate instruction in Ancient History; Medieval Europe; Modern Europe: American History; England and the Commonwealth; Russia; Latin America; the Far East in the modern period; South Asia in the modern period; military history; and historiography.

Students may receive credit for either semester of a hyphenated course without taking the other semester if they obtain written permission from the instructor and the Director of Graduate Studies.

FOR SENIORS AND GRADUATES

203-204. THE UNITED STATES, 1850-1900.—The rise of sectionalism, secession, wartime problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform. 6 units.
PROFESSOR WOODY

205-206. THE UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units.
PROFESSOR WATSON

209-210. CONSTITUTIONAL HISTORY OF THE UNITED STATES, 1760 TO THE PRESENT.—A study of the basic problems in forming the Constitution; of its development through the major crises in the history of the United States; of the effects of changing social, cultural, economic, and political conditions on the Constitution. 6 units. (Not 1964-65)

212. RECENT INTERPRETATIONS OF UNITED STATES HISTORY.—A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. 3 units.
PROFESSOR WATSON

213-214. THE OLD SOUTH.—Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufacturing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 units. (Not 1964-65)
PROFESSOR WOODY

215-216. THE DIPLOMATIC HISTORY OF THE UNITED STATES.—A study of the history of American diplomacy, with particular emphasis upon those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 units.
ASSISTANT PROFESSOR DAVIS

217, 218. EUROPE SINCE 1870.—International relations since the Franco-German War is the chief subject of study in this course; special emphasis is placed upon the underlying economic and political influences. 6 units.

221-222. THE AGE OF THE RENAISSANCE.—The decline of characteristic features of medieval civilization and the rise of modern European institutions with particular attention to intellectual movements from Dante to Erasmus. 6 units.
PROFESSOR NELSON

223-224. THE OLD REGIME AND THE FRENCH REVOLUTION, 1661-1815. A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 units.
ASSOCIATE PROFESSOR ACOMB

225-226. THE AGE OF THE REFORMATION.—A survey of European civilization from 1500 through the Peace of Westphalia. 6 units. (Not 1964-65)
PROFESSOR NELSON

227, 228. EUROPE IN THE NINETEENTH CENTURY.—A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 units. (Not 1964-65)
PROFESSOR PARKER

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 3 units.
PROFESSOR PARKER

231-232. THE HISPANIC COLONIES AND REPUBLICS IN AMERICA.—6 units.
PROFESSOR LANNING

233-234. THE INSTITUTIONAL, CULTURAL, AND SOCIAL HISTORY OF HISPANIC AMERICA.—The first semester deals with the culture, society, and institutions of the Spanish colonies in America, and the second semester with those of the Hispanic American Republics. 6 units. (Not 1964-65). PROFESSOR LANNING

235, 236.—EUROPEAN EXPANSION OVERSEAS.—In the first semester attention is given to the age of discovery, and to the origin and the development of the great European overseas empires with special emphasis on the role of the Portuguese in India and the Americas. The work of the second semester deals with the decline of the mercantile empires, the emergence of independent centers of European culture overseas (Brazil being taken as an example), and the revival of mercantile imperialism in the late nineteenth and twentieth centuries. 6 units.
PROFESSOR MANCHESTER

237-238. EUROPE IN THE MIDDLE AGES, 395-1500.—Attention is given both to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 units. ASSISTANT PROFESSOR YOUNG

241-242. NATIONALISM AND COMMUNISM IN THE FAR EAST.—The growth of nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 units.
ASSISTANT PROFESSOR GILLIN

245-246. WAR IN THE MODERN WORLD.—This course is concerned with the relations between warfare and modern political, economic and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 units.
PROFESSOR ROPP

247. THE HISTORY OF MODERN INDIA, 1757-1857.—Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 units. PROFESSOR CRANE

248. THE HISTORY OF MODERN INDIA AND PAKISTAN, 1857-1947.—Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 units. PROFESSOR CRANE

249-250. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—Evolution of American society and thought to the present; lectures and class discussions seek to illuminate the interplay of ideas and social practice by the examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 units. PROFESSOR HOLLEY

251-252. RECENT EUROPEAN HISTORY.—A history of the political and economic developments in Europe since 1870. 6 units. PROFESSOR COLTON

257. SOCIAL AND CULTURAL HISTORY OF THE HELLENISTIC WORLD FROM ALEXANDER TO AUGUSTUS.—Lectures, readings, and discussions. This course will not be separately credited without the sequel, 258. 3 units.
PROFESSOR ROGERS

258. SOCIAL AND CULTURAL HISTORY OF THE GRAECO-ROMAN WORLD.—The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues 257 and will not be separately credited. 3 units.
PROFESSOR ROGERS

259-260. THE EMERGENCE OF THE NEW SOUTH, 1865 TO THE PRESENT.—Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 units.
ASSOCIATE PROFESSOR DURDEN

261-262. RUSSIA IN THE TWENTIETH CENTURY.—A study of the background of the Revolution of 1917 followed by an analysis of the history and policies of the Soviet state. 6 units. ASSISTANT PROFESSOR LERNER

263-264. AMERICAN COLONIAL HISTORY AND THE REVOLUTION, 1607-1789.—The founding and institutional development of the English colonies: the background, progress, and results of the Revolution. 6 units. PROFESSOR ALDEN

265-266. THE DEVELOPMENT OF ARGENTINA, BRAZIL, AND CHILE.—Political, social, and economic history of the ABC powers since independence. (Not open to students who have had 131-132). 6 units.

267, 268. FROM MEDIEVAL TO EARLY MODERN ENGLAND.—The intellectual, social, and political problems of transition to modern England, with special emphasis on the English Renaissance. 6 units. PROFESSOR FERGUSON

269. BRITISH HISTORY FROM 1714 to 1867.—The interrelationship of the leadership of such men as Walpole, Chatham, Pitt, and Peel with war, revolution, and social institutions; the rise of the cabinet system; the Industrial Revolution; imperial changes; and reform. 3 units. PROFESSOR HAMILTON

270. GREAT BRITAIN AND THE COMMONWEALTH OF NATIONS, 1867 TO THE PRESENT.—A history of Great Britain at the height of her world dominance and beyond, her oceanic empire, and the evolution of that empire into a unique world-wide Commonwealth of Nations. 3 units. PROFESSOR HAMILTON

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as Religion 285.) 3 units. ASSISTANT PROFESSOR SULLIVAN

297. THE BRITISH EMPIRE IN THE NINETEENTH CENTURY (From 1783).—3 units.

298. THE COMMONWEALTH IN THE TWENTIETH CENTURY.—3 units.

FOR GRADUATES

303-304. The UNITED STATES IN THE TWENTIETH CENTURY.—The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units. PROFESSOR WATSON

305-306. SEMINAR IN ENGLISH AND COMMONWEALTH HISTORY.—The work consists of practical training in the methods of historical research based on sources for modern British history. 6 units.

PROFESSORS FERGUSON AND HAMILTON

307-308. SEMINAR IN UNITED STATES HISTORY.—6 units.

PROFESSORS HOLLEY AND WATSON, AND ASSOCIATE PROFESSOR DURDEN

309-310. SEMINAR IN AMERICAN COLONIAL AND REVOLUTIONARY HISTORY.—6 units.

PROFESSOR ALDEN

315-316. SEMINAR IN SOUTHERN HISTORY.—Year course. 6 units.

PROFESSOR WOODY

317-318. SEMINAR IN THE HISTORY OF WESTERN EUROPE.—6 units.

PROFESSORS COLTON AND PARKER, AND ASSISTANT PROFESSOR SCOTT

321-322. SEMINAR IN THE HISTORY OF SPAIN, HISPANIC AMERICA, AND INTER-AMERICAN RELATIONS.—6 units. PROFESSOR LANNING

343-344. SEMINAR IN THE HISTORY OF AMERICAN FOREIGN RELATIONS.—6 units.

347-348. SEMINAR IN RECENT INDIA.—6 units. PROFESSOR CRANE

361-362. SEMINAR IN THE HISTORY OF RUSSIA.—6 units.

PROFESSOR CURTISS

401. SEMINAR IN THE BRITISH COMMONWEALTH.—3 units.

PROFESSORS COLE, HAMILTON, AND SPENGLER

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN.—3 units.

PROFESSOR BRAIBANTI, VISITING PROFESSOR ISLAM, ASSOCIATE PROFESSOR SINHA

### HISTORIOGRAPHY AND THE TEACHING OF HISTORY

FOR GRADUATES

312. SEMINAR IN THE TEACHING OF HISTORY IN COLLEGE.—The work in this course is intended to acquaint students with the problems involved in teaching history in college. It includes critical observation of the teaching by members of the History staff in Duke University. Year course. 2 units.

PROFESSOR MANCHESTER

This course is required of all candidates for the degree of Doctor of Philosophy who are in residence as many as two years at Duke University.

320. HISTORIOGRAPHY.—A critical study of the process of finding, appraising, and interpreting the sources of history and of the presentation of the results in narrative. Works of important historians from Herodotus to the present are analyzed. The student undertakes specific exercises in research, criticism, and narration. There is consideration of such general topics as schools, theories, philosophies, and the function of history. Year course. 4 units. PROFESSOR NELSON

This course is required of all candidates for the degree of Doctor of Philosophy who are in residence as many as two years at Duke University.

## HOSPITAL ADMINISTRATION

PROFESSOR BROWN, PROGRAM DIRECTOR—1140 HOSPITAL; PROFESSOR FRENZEL; ASSOCIATE PROFESSOR SWANSON; ASSISTANT PROFESSOR SMITH, COORDINATOR OF GRADUATE STUDIES—1140 HOSPITAL

Graduate study leading toward preparation for a career of administration in hospitals and other health agencies is offered through a 24-month program leading to the M.H.A. Degree. The program in Hospital Administration is composed of 36 graduate units, of which 18 are in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology. Included in the program is a 12-month administrative residency, a period of supervised administrative experience conducted under faculty supervision in hospitals and other health agencies located within commuting distance of the University campus. Admission to this program is limited to 12 students per year; selection is based on suitability for management of health agencies as well as on capability for graduate study. As there are requirements for participation in the program in Hospital Administration in addition to basic admission requirements of the Graduate School, interested individuals should obtain complete information on prerequisites and selection procedures from the Director of Graduate Studies.

201. HISTORY AND DEVELOPMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions, analysis of medical care organizations in the United States, and an introduction to the medical sciences and to medical terminology. 3 units.

ASSISTANT PROFESSOR SMITH

203-204. PRINCIPLES OF ORGANIZATION AND MANAGEMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—A study of the hospital as an institution including its administrative structure, relationship of the medical staff, and the organization and function of each department. Emphasis is placed on the financial, legal, staffing, community relationship, and other managerial considerations of hospital administration. 6 units.

PROFESSORS BROWN AND FRENZEL, ASSOCIATE PROFESSOR SWANSON, ASSISTANT PROFESSOR SMITH

211-212. SEMINARS IN HEALTH ADMINISTRATION.—A series of seminars designed to complement and add depth to the material covered during the first year, to analyze further the operation of hospitals and other health agencies, and to make the experiences of the residency meaningful.

Attention will be given to formalized techniques of problem-solving, decision-making, human relations, communications, and relating day-to-day experiences to the management process.

Special emphasis will be placed on social and economic aspects of health care and on identifying and projecting current trends in the health field. 6 units.
STAFF AND PRECEPTORS

215. ADMINISTRATIVE RESIDENCY (1 calendar year).—Designed to give the student broader and deeper knowledge and understanding of hospitals and other health agencies through practical experience. Varied experience is provided by rotation through a university medical center, a community hospital, a Veterans Administration and special hospitals, a public health department, a prepayment plan, and other governmental and voluntary health agencies. Two months of the residency will be spent in field experience with the Hospital Section of The Duke Endowment. 3 units. STAFF AND PRECEPTORS

## MATHEMATICS

PROFESSOR GERGEN, CHAIRMAN—134 PHYSICS BUILDING; ASSOCIATE PROFESSOR WARNER, DIRECTOR OF GRADUATE STUDIES—223 PHYSICS BUILDING; PROFESSORS CARLITZ, DRESSEL, ELLIOTT, MURRAY, ROBERTS, AND THOMAS; ASSOCIATE PROFESSORS SHOENFIELD, GALLIE, AND REYNOLDS; ASSISTANT PROFESSORS BRYSON, BURDICK, DEAN, HARRIS, HINRICHS, KELINGOS, SCOVILLE, AND STACKELBERG

Graduate work in the Department of Mathematics is offered leading to the A.M. and Ph.D. degrees. The student, in his undergraduate work, must have had courses in differential and integral calculus, and at least 6 semester hours of other courses in mathematics on the junior or senior level.

The A.M. degree with a major in mathematics is awarded primarily on the basis of scholarship. Of the 24 units of course work required for this degree, 18 units must be taken in the Department of Mathematics.

The Ph.D. degree in mathematics is awarded upon the demonstration of ability and training in research. The original dissertation, therefore, is the most important of the formal requirements for the degree.

Since a reading knowledge of French, German, and Russian is highly desirable for the student of mathematics, he should satisfy the language requirements in two of these languages as early as possible.

213-214. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations, matrices. 6 units. (1964-65, Retired Officers Program only) PROFESSOR THOMAS

215-216. INTERMEDIATE ANALYSIS.—Elements of the theory of functions, principally for real variables. Sequences and series, continuity, differentiation, integration. 6 units. (1964-65, Retired Officers Program only) PROFESSOR GERGEN

217-218. ANALYSIS—Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 units. STAFF

221. DIGITAL COMPUTER.—History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; compilers; error analysis. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. 3 units. ASSOCIATE PROFESSOR GALLIE

222. INTRODUCTION TO NUMERICAL ANALYSIS.—Error analysis; real and complex roots of equations; finite difference methods and theory of interpolation; numerical differentiation and integration; numerical integration of ordinary and partial differential equations; simultaneous equations and matrix inversion. A fee of $8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 221. 3 units. ASSOCIATE PROFESSOR GALLIE

225. THEORY OF EQUATIONS.—Permutations, determinants, matrices, linear systems, polynomials and their roots, constructibility, resultants, discriminants, simultaneous equations. 3 units. (Not 1964-65) STAFF

227-228. THEORY OF NUMBERS.—Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums of squares. Prerequisite: calculus. 6 units. (1964-65) PROFESSOR CARLITZ

229-230. ALGEBRAIC NUMBERS.—Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: theory of equations. 6 units. (Not 1964-65) PROFESSOR CARLITZ

233. STATISTICAL METHODS.—Parameter estimation and hypotheses testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 units. ASSISTANT PROFESSOR BRYSON

234. SAMPLE DESIGNS.—Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 units. ASSISTANT PROFESSOR BRYSON

235-236. ABSTRACT ALGEBRA.—Groups, fields, rings, matrices, quadratic and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: calculus. 6 units. STAFF

244. DESIGN OF EXPERIMENTS.—Methods of constructing and analyzing designs for experimental investigations, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 units. ASSISTANT PROFESSOR BURDICK

245-246. COMBINATION ANALYSIS.—Generating functions, permutations, distributions, partitions, compositions, trees, and networks. Prerequisite: calculus. 6 units. (Not 1964-65) PROFESSOR CARLITZ

247-248. ARITHMETIC OF POLYNOMIALS.—Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 236 or consent of the instructor. 6 units. (1964-65) PROFESSOR CARLITZ

253-254. DIFFERENTIAL GEOMETRY.—Curves and surfaces in three-dimensional Euclidean space, applicability, differential parameters, Riemannian geometry of n-space. Prerequisite: calculus. 6 units.* PROFESSOR THOMAS

271-272. INTRODUCTORY TOPOLOGY.—Topological properties of Euclidean spaces, set-theoretic and combinatorial methods. Prerequisite: calculus. 6 units. PROFESSOR ROBERTS

283. PROBABILITY FOR ENGINEERS.—Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: calculus. 3 units. ASSISTANT PROFESSOR BURDICK

285. APPLIED MATHEMATICAL METHODS I.—Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 units. PROFESSOR DRESSEL

286. APPLIED MATHEMATICAL METHODS II.—Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Mathematics 64. 3 units. PROFESSOR DRESSEL

287-288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 63, or consent of the instructor. 6 units. (Not 1964-65) ASSOCIATE PROFESSOR SHOENFIELD

291-292. THEORY OF FUNCTIONS.—Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: calculus. 6 units. STAFF

FOR GRADUATES

325-326. REAL VARIABLE.—Number system, Lebesgue and Stieltjes integrals, topics in Fourier series. Prerequisite: Mathematics 291-292. 6 units. STAFF

327-328. PARTIAL DIFFERENTIAL EQUATIONS.—Boundary and initial value problems, regularity and existence theorems by methods of *a priori* estimates and functional analysis. Representations of solutions, spectral theory, and potential theory. Prerequisite: Mathematics 291-292 or consent of the instructor. 6 units. (Not 1964-65) ASSISTANT PROFESSOR HARRIS

331-332. ADVANCED TOPICS IN COMPLEX VARIABLES.—Entire and meromorphic functions; harmonic functions and potential theory; Riemann surfaces; several complex variables. 6 units. (1964-65) ASSISTANT PROFESSOR HARRIS

333-334. ANALYTIC THEORY OF NUMBERS.—Distribution of primes, primes in an arithmetic progression, Waring and Goldbach problems, applications of elliptic functions. Prerequisite: Mathematics 291-292. 6 units. (Not 1964-65) PROFESSOR CARLITZ

337-338. EXISTENCE THEOREMS.—Systems of partial differential equations, Pfaffian systems, theorems of Cauchy, Riquier, and Cartan, singular integral varieties. Prerequisite: Mathematics 291-292. 6 units.* PROFESSOR THOMAS

343-344. ORDINARY DIFFERENTIAL EQUATIONS.—Solution by separation of variables, exact differentials, integrating factors, solution in series. Cauchy's existence theorem, linear differential systems, singular points, partial differential equations equivalent to ordinary systems. Prerequisite: Mathematics 291-292. 6 units.* PROFESSOR THOMAS

371-372. DIMENSIONAL THEORY.—Abstract spaces, separation theory for Euclidean spaces, dimension theory. Prerequisite: Mathematics 271-272. 6 units.* PROFESSOR ROBERTS

383 384. LIE GROUPS AND ALGEBRAS.—Differential manifolds; Lie groups; one-parameter subgroups; Lie algebras; differential forms; classification and representations of compact Lie groups and semisimple Lie algebras; solvable and nilpotent algebras; Ado's theorem. Prerequisite: Mathematics 236 and either Mathematics 272 or 292. 6 units. (Not 1964-65) ASSOCIATE PROFESSOR SHOENFIELD

395-396. TOPOLOGICAL ALGEBRA.—Normed and locally convex spaces, Banach algebras. Prerequisite: Mathematics 236 and 292, or consent of instructor. 6 units. (1964-65) ASSOCIATE PROFESSOR WARNER

## MICROBIOLOGY AND IMMUNOLOGY

PROFESSOR CONANT, CHAIRMAN—321 BELL BUILDING AND ASSOCIATE PROFESSOR GROSS, DIRECTOR OF GRADUATE STUDIES, 350 BELL BUILDING; PROFESSORS AMOS, BEARD, LARSH, RUNDLES, AND D. T. SMITH; ASSOCIATE PROFESSORS DAY, OVERMAN, WILLETT; ASSISTANT PROFESSORS METZGAR, OSTERHOUT, ZMIJEWSKI; INSTRUCTOR EIRING

(See MEDICAL SCHOOL, p. 116.)

M211. HEMATOLOGY.—Three lectures and three laboratory periods of 3 hours each, weekly, for eleven weeks in the spring quarter. Prerequisites: courses in general zoology, general botany, histology, and comparative anatomy. 4 units. PROFESSOR RUNDLES

M221. BACTERIOLOGY AND IMMUNOLOGY.—This course is devoted primarily to the study of the biological and immunological relationships of microorganisms (bacteria, fungi, Rickettsia, and viruses) in disease. Five lectures, two 1-hour conferences, and three laboratory periods of 3 hours each weekly, in fall quarter. Prerequisites: courses in general zoology, general botany, histology and comparative anatomy, general and organic chemistry. 6 units.

PROFESSORS AMOS, CONANT, D. T. SMITH; ASSOCIATE PROFESSORS DAY, GROSS, OVERMAN, WILLETT; ASSISTANT PROFESSORS METZGAR, OSTERHOUT, ZMIJEWSKI; INSTRUCTOR EIRING

M291. MEDICAL PARASITOLOGY.—One lecture and one three-hour laboratory period per week for eleven weeks during the fall quarter. Prerequisites: courses in Zoology 204, general botany, histology and comparative anatomy. 1 unit.
PROFESSORS CONANT AND LARSH; INSTRUCTOR EIRING

231. FUNDAMENTALS OF IMMUNOLOGY.—A lecture course on general immunology including the following: non-specific factors in immunity, nature of antigens and antibodies, antibody production, complement, serological methods, blood groups, autoimmune diseases, tumor, immunity, transplantation immunity, and hypersensitivity. 2 units. (Alternate years, fall semester)
PROFESSOR AMOS; ASSOCIATE PROFESSOR DAY; ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

301. PRINCIPLES AND TECHNIQUES OF MAMMALIAN CELL CULTURE.—General principles and techniques of mammalian cell and organ culture in relation to problems in cell biology, pathology, and microbiology. 2 units. (Spring semester) INSTRUCTOR EIRING

302. MICROBIAL GENETICS.—A seminar and lecture course in microbial genetics with special emphasis on gene structure and functions. Admission by permission of instructor. 2 units. (Spring, alternate years) ASSOCIATE PROFESSOR GROSS

303. ANIMAL VIRUSES AND ANIMAL VIRUS DISEASES.—A seminar course to explore various aspects of virus morphology, growth characteristics, immunology and the pathogenesis of virus diseases. Admission with the approval of the staff. (Spring) 2 units. ASSOCIATE PROFESSOR OVERMAN AND ASSISTANT PROFESSOR OSTERHOUT

310. MICROBIAL PHYSIOLOGY.—Lecture and seminar course devoted to the physiology and comparative biochemistry of microorganisms. Prerequisites: Introductory Biochemistry 201 or equivalent. 2 units. ASSOCIATE PROFESSOR WILLETT

311. ADVANCED IMMUNOLOGY.—Genetic control of antigen production, development of antigens in embryogenesis, destruction of antigens in tissue, relationship to differentiation, aggregation. Theories of antibody formation. Nature of antibodies; combining site: antibodies of similar specificity but different properties, reactivity of antibody fractions. Mechanisms of tolerance and immunological paralysis, split and partial tolerance, immunological enhancement. Cellular immunity and the reactions of circulating and cytrophilic antibody. Homograft rejections and auto immunity and delayed hypersensitivity. 2 units.
PROFESSOR AMOS; ASSOCIATE PROFESSOR DAY; ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

312. CANCER IMMUNOLOGY.—An intensive and critical analysis of progress in a major branch of immunological research covering cancer antigens, the tumor-homograft reaction, and the immunotherapy of cancer. Prerequisite: consent of the instructor. 2 units. ASSOCIATE PROFESSOR DAY

313. IMMUNOHEMATOLOGY.—A lecture and laboratory demonstration course covering the serological, genetic, and anthropological aspects of human blood groups isoantigens and antibodies. 2 units. ASSISTANT PROFESSOR ZMIJEWSKI

314. IMMUNOCHEMISTRY.—The structure of antibody molecules. The nature of the combining site. The hapten as a molecular probe. Forces involved in antigen–antibody interaction. Specificity, avidity, and cross-reaction of antibodies. Purification of antibodies. Antibodies as analytical reagents. Prerequisites: Fundamentals of Immunology or Biochemistry or Physical Chemistry or consent of instructor. 2 units. ASSOCIATE PROFESSOR DAY

315. METHODS IN IMMUNOLOGY.—This is essentially a laboratory course in which the student will become familiar with the following methods of immunology: agar precipitation, immunoelectrophoresis, direct agglutination, indirect agglutination, immunofluorescence, complement-fixation and passive cutaneous anaphylaxis. 3 units. ASSISTANT PROFESSORS METZGAR AND ZMIJEWSKI

316. ANTIGENIC FACTORS IN GRAFT REJECTION.—Production of inbred and co-isogenic strains. Mutation and recombination in inbred animals and tumors. Genetic control of histocompatibility iso-antigens in tumors and normal tissues, differential gene action in hybrids and tumors. Antigenic and immunogic factors in homograft rejection, tests for genetic compatibility. Modification of the immune

response by genetic or immunologic procedures—tolerance, enhancement, suppression of antigens. 2 units. PROFESSOR AMOS

323. READINGS IN BACTERIOLOGY AND IMMUNOLOGY.—This course is intended primarily for graduate students majoring in bacteriology, but it is also available as a minor to other graduate students in related fields, to whom it is recommended by respective supervising committees and with the approval of the Department of Microbiology. Prerequisites: Bacteriology and Immunology, M221. 4 units per semester. PROFESSOR D. T. SMITH

324. RESEARCH SEMINAR ON VIRUSES.—Limited to advanced students. 2 units per semester. PROFESSOR BEARD

325. MEDICAL MYCOLOGY.—This course is intended to familiarize the graduate student majoring in mycology with the fungi causing disease in man and animal. The course includes practical laboratory work with materials from patients in Duke Hospital and those sent to the Duke Fungus Registry from outside sources. Prerequisites: A.M. in Botany with major in mycology and M221. Course limited to four students each year. 4 units per semester. PROFESSOR CONANT

326-327. MICROBIOLOGY SEMINAR.—Graduate students and staff meet weekly to discuss and review recent microbiological literature. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units.

328. SEMINAR IN IMMUNOLOGY.—Selected topics on various aspects of immunology will be discussed. Seminars will be by both students and faculty. 1 unit. Spring semester. ASSISTANT PROFESSOR METZGAR

## PHILOSOPHY

PROFESSOR BAYLIS, CHAIRMAN—212D WEST DUKE BUILDING; PROFESSOR WELSH, DIRECTOR OF GRADUATE STUDIES—212A WEST DUKE BUILDING; PROFESSORS PEACH AND NEGLEY; ASSOCIATE PROFESSORS CLARK AND WILSON; ASSISTANT PROFESSORS BINKLEY AND SPECTOR

The Department of Philosophy offers graduate work leading to the A.M. and Ph.D. degrees. Tutorial work complements formal instruction. Students may specialize in any of the following fields: the History of Philosophy; Logic; Philosophy of Science; Epistemology; Metaphysics; Philosophical Analysis; Ethics; Aesthetics; Political Philosophy and Philosophy of Law. Applicants for admission should offer scores of the Graduate Record Examination or the Miller Analogies Test. Scores are required of applicants for an award.

Individual programs of study are developed for each student. The following requirements, however, are fundamental: (1) In February of their first year new graduate students in philosophy who are not then taking the preliminary examinations for the Ph.D. are required to take three qualifying examinations: one in the history of philosophy, ancient and modern; one on a central philosophical topic, treated systematically; and one in logic, both classical and symbolic. The examination in logic will be waived if, during the first semester, a student has passed with a grade of E or G Philosophy 331c, Logic. A student's achievement on these examinations will be regarded as indicative of his ability to undertake advanced graduate work. (2) Preliminary examinations for the Ph.D., which may be taken only after a student has met the language requirements for that degree, should be taken during the first year of study beyond the A.M. degree, but in any case not later than the end of the second year. In these examinations students are expected to combine historical knowledge with critical understanding.

Work in a minor field outside of the Department, but not necessarily confined to any one department, must include six units for the A.M. or the Ph.D. and may include more as a student's program requires or permits.

### FOR SENIORS AND GRADUATES

202. PHILOSOPHY OF ART.—A study of some fundamental issues in aesthetics, with particular reference to the fields of literature, music, and painting. Problems discussed include: the nature and purposes of the arts; meaning in the arts; art and morality; the role of standards in art criticism; aesthetic judgment; interpretation and evaluation. 3 units. PROFESSOR WELSH

203. CONTEMPORARY ETHICAL THEORIES.—Study of the nature and justification of basic ethical concepts and principles in the light of the chief ethical theories of twentieth-century British and American philosophers.
PROFESSOR BAYLIS AND ASSISTANT PROFESSOR BINKLEY

205. PHILOSOPHY OF HISTORY.—Discussion of the method, metaphysical implications and influence of interpretations of history: Hegel, Marx, Spengler, Toynbee. 3 units. PROFESSOR NEGLEY

208. POLITICAL VALUES.—Analysis of the systematic justification of political principles and the status of political values in the administration of law. 3 units.
PROFESSOR NEGLEY

211. PLATO.—A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 units.
ASSISTANT PROFESSOR BINKLEY

217. ARISTOTLE.—A study of parts of the *Organon, Physics,* and *Metaphysics.* 3 units. (1964-65) ASSOCIATE PROFESSOR WILSON

219. KANT.—Reading and discussion of his philosophy, with some attention to historical continuity. 3 units.* PROFESSOR NEGLEY

225. BRITISH EMPIRICISM.—A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 units. (Not 1964-65) PROFESSOR PEACH

227. CONTINENTAL RATIONALISM.—A critical study of the writings of Descartes, Spinoza, or Leibniz, with special emphasis on problems in the theory of knowledge and metaphysics. 3 units. PROFESSOR PEACH

228. RECENT AND CONTEMPORARY PHILOSOPHY.—A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 units. PROFESSOR WELSH

229. AMERICAN PRAGMATISM.—Studies in the philosophy of Peirce, James, Dewey, and Mead. 3 units.* PROFESSOR WELSH

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: Contemporary Theology 232-233 or consent of instructor. (also listed as Religion 230) 3 units. ASSOCIATE PROFESSOR POTEAT

233. INTRODUCTION TO THE PHILOSOPHY OF SCIENCE.—A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. 3 units.
ASSISTANT PROFESSOR SPECTOR

234. PHILOSOPHY AND THE SCIENCES.—Selected problems in the physical and non-physical sciences. Topics such as space, time, measurement, probability, and induction, and problems in the philosophy of the behavioral and social sciences. Prerequisite, Philosophy 233. 3 units. ASSISTANT PROFESSOR SPECTOR

235. PHILOSOPHY AND THE SCIENCES.—An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincare, and Einstein. (1964-65) 3 units. ASSISTANT PROFESSOR SPECTOR

236. SPECIAL PROBLEMS IN THE PHILOSOPHY OF SCIENCE.—Selected topics concerning the methods of the sciences and the philosophy of science. Prerequisite: previous work in the philosophy of science or the consent of the instructor. (1964-65) 3 units. ASSISTANT PROFESSOR SPECTOR

241. LOGIC.—Fundamental Problems of Logic. 3 units.*
ASSOCIATE PROFESSORS CLARK AND WILSON

246. GENERAL SEMANTICS AND THEORY OF LANGUAGE.—An examination of semantical theory through Frege, Russell, Carnap and Quine, together with a consideration of the implications of meaning theory for general philosophy. 3 units.* ASSOCIATE PROFESSOR WILSON

250. PHILOSOPHICAL ANALYSIS.—A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and

results of this movement. 3 units. PROFESSOR BAYLIS, ASSOCIATE PROFESSOR CLARK, AND ASSISTANT PROFESSOR BINKLEY

252. METAPHYSICS.—A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 units. PROFESSOR BAYLIS

287-288. FOUNDATIONS OF MATHEMATICS.—Propositional calculus, predicate calculus, axiomatized number theory. Godel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 53, or consent of instructor. 6 units. (Also listed as Mathematics 287-288.)
ASSOCIATE PROFESSOR SHOENFIELD

291, 292. CRITICAL PHILOSOPHY.—The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem-solving. 3 units each. Enrollment only by permission of the Department. 291 is ordinarily prerequisite for 292.
ALL MEMBERS OF THE GRADUATE STAFF

FOR GRADUATES

331, 332. SEMINAR IN SPECIAL FIELDS OF PHILOSOPHY.—3 units.
ALL MEMBERS OF THE GRADUATE STAFF

## PHYSICS

PROFESSOR FAIRBANK, CHAIRMAN—119 PHYSICS BUILDING; PROFESSOR GREULING, DIRECTOR OF GRADUATE STUDIES; PROFESSORS BIEDENHARN, FOWLER, GORDY, LEWIS, NEWSON, NIELSEN, SPONER; ASSOCIATE PROFESSOR MEYER; VISITING ASSOCIATE PROFESSOR ROBL; ASSISTANT PROFESSORS BILPUCH, EVANS, MIYAGAWA, ROBERSON, ONLEY, SAYLOR, TANGHERLINI, TILLEY, AND WALTER; INSTRUCTORS HARRIS AND WINNEWISSER

The Department of Physics offers graduate work leading to the A.M. and Ph.D. degrees. Course work is designed to give a broad basic foundation in classical and modern physics. All graduate students will be expected to acquire a thorough knowledge of the various branches of classical physics and some familiarity with modern physics and with basic laboratory skills. They will be required to take such course work in the 200-number courses as may be necessary to obtain this foundation.

The student will be required to take such course work as will best be adapted to the kind of work he will subsequently specialize in and to the kind of research he will undertake. The choice of minor will be similarly determined.

Since a practical reading knowledge of French and German is highly desirable for the student of physics, he should satisfy these language requirements as early as possible.

FOR SENIORS AND GRADUATES

201-202. MECHANICS.—The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and right bodies; the methods of Lagrange and Hamilton; generalized mechanics. Prerequisite: Physics 125. 6 units.
ASSISTANT PROFESSOR TANGHERLINI

213-214. CONTEMPORARY PHYSICS.—A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 units. ASSISTANT PROFESSOR WALTER

217-218. ADVANCED PHYSICS LABORATORY.—Measurements involving the fields of mechanics, electricity, magnetism, heat, sound, optics and modern physics. 2-6 units. ASSOCIATE PROFESSOR MEYER

219. ELECTRICITY AND MAGNETISM.—Fundamentals of electricity and magnetism, physical optics, electromagnetic waves. 3 units.
ASSOCIATE PROFESSOR GREULING

220. ADVANCED ELECTRONICS.—Vacuum tubes and solid state devices, advanced circuit analysis. 3 or 4 units. INSTRUCTOR WINNEWISSER

221-222. THEORETICAL PHYSICS.—Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 units.
VISITING ASSOCIATE PROFESSOR ROBL

FOR GRADUATES

303, 304. THERMODYNAMICS, STATISTICAL MECHANICS.—Fundamental laws of thermodynamics and statistical mechanics with applications to physics and chemistry. Properties of gases and elements of quantum statistics. 6 units.
INSTRUCTOR HARRIS

306. LOW TEMPERATURE PHYSICS.—A study of the properties of matter near the absolute zero of temperature; superconductivity, liquid helium, adiabatic demagnetization. Prerequisite: Physics 303. 3 units. PROFESSOR FAIRBANK

309. SOLID STATE.—A study of matter in the condensed state, including metals, insulators and semiconductors; theory of cooperative effects; thermal and magnetic properties of matter. Prerequisite: Physics 303. 3 units. (Not 1964-65)
ASSOCIATE PROFESSOR MEYER

315-316. PRINCIPLES OF QUANTUM THEORY.—Original and fundamental concepts of quantum theory; wave and matrix mechanics; theory of measurements; exclusion principle and electronic spin. Prerequisite: Physics 201-202. 6 units.
ASSISTANT PROFESSOR ONLEY

318-319. ELECTROMAGNETIC FIELD THEORY.—Electrostatics and potential theory; dielectric and magnetic media; the magnetic field of currents and the law of induction. Maxwell's electrodynamics; theory of wave optics; refraction; interference and diffraction; relativity. Prerequisite: Physics 219. 6 units.
PROFESSOR GREULING

323. THEORY OF ATOMIC SPECTRA.—Excitation of spectra, computation of wave lengths from photographs of spectra, study of the structure of atomic spectra with applications. 3 units. PROFESSOR SPONER

324. THEORY OF MOLECULAR SPECTRA.—A study of the structure of molecular spectra with applications. 3 units. (Not 1964-65) PROFESSOR SPONER

331. MICROWAVE RADIATION.—Microwave generators, cavity resonators, transmission lines, radiation propagation and detection. 3 units. PROFESSOR GORDY

335. MICROWAVE SPECTROSCOPY.—Application of microwaves in the determination of molecular, atomic, and nuclear properties. Stark and Zeeman effects in microwave spectroscopy. Magnetic resonance absorption. 3 units. (Not 1964-65)
PROFESSOR GORDY

341. ADVANCED TOPICS IN QUANTUM THEORY.—Quantum theory of radiation and collisions with special reference to nuclear and high energy physics. Prerequisite: Physics 315-316. 3 units. (Not 1964-65) PROFESSOR BIEDENHARN

343. NUCLEAR PHYSICS.—Elementary theory of the deuteron; low energy neutron proton scattering; theory of nuclear reactions; penetration of potential barriers; nuclear energy levels. Prerequisite: Physics 315. 3 units. PROFESSOR NEWSON

344. ADVANCED NUCLEAR PHYSICS.—The deuteron, nuclear forces, scattering of elementary particles, beta-radiation. Other aspects of nuclear physics susceptible of theoretical interpretation. Prerequisite: Physics 343. 3 units. (Not 1964-65) PROFESSOR BIEDENHARN

345. HIGH ENERGY PHYSICS.—Experimental and theoretical aspects of high energy nuclear processes; properties of mesons and hyperons. 3 units.
PROFESSOR FOWLER

346. TOPICS IN THEORETICAL PHYSICS.—The content of this course will vary from year to year. General methods in quantum mechanics such as: group theory and its applications; elementary particle theory; field theory; theory of

solids; theoretical nuclear physics; atomic and molecular structure. The topic for 1963-64 was elementary particle theory. Prerequisite: Physics 315-316. 3 units.
ASSISTANT PROFESSOR EVANS

351-352. SEMINAR.—A series of weekly discussions on topics related to the research projects under investigation in the department. 2 units.
ALL MEMBERS OF THE GRADUATE STAFF

## PHYSIOLOGY AND PHARMACOLOGY

(See MEDICAL SCHOOL, p. 116.)

PROFESSOR TOSTESON, CHAIRMAN—203 MEDICAL SCHOOL; ASSOCIATE PROFESSOR KOSTYO, DIRECTOR OF GRADUATE STUDIES—251 MEDICAL SCHOOL; PROFESSORS F. BERNHEIM, HALL, AND RENKIN; ASSOCIATE PROFESSORS BLUM, DETURK, HOROWICZ, HULL, LONG, AND MOORE; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSORS MCMANUS, OTTOLENGHI, AND SALZANO

M260. CELLULAR ASPECTS OF DRUG ACTION.—An introduction to cell-drug interaction with emphasis placed on mechanisms of action and structure-activity relationships of chemical agents. Prerequisites: organic chemistry, introductory animal or plant physiology. Undergraduates by permission of instructors. 1 unit. PROFESSOR F. BERNHEIM, ASSOCIATE PROFESSOR DETURK AND ASSISTANT PROFESSOR OTTOLENGHI

M261-262. HUMAN PHYSIOLOGY.—Six lectures and twenty laboratory hours per week. Prerequisites: Anatomy M201 and Biochemistry M241 (or equivalents) and at least one year of college physics. Feb.-June. Credits depending on work taken. (Maximum 8 units.) ALL MEMBERS OF THE GRADUATE STAFF

M271. CONTEMPORARY PHYSIOLOGY.—Contemporary physiology taught from the current literature. Prerequisite: Physiology M261-262 or the equivalent. 4 units. ALL MEMBERS OF THE GRADUATE STAFF

M279. INTRODUCTORY SEMINAR IN PHYSIOLOGY.—Weekly discussions by the staff outlining the scope of modern physiology. Required of all graduate students majoring in physiology. 1 unit. ALL MEMBERS OF THE GRADUATE STAFF

M365. RESPIRATION AND AERO-PHYSIOLOGY.—A study of the fundamental respiratory processes in living organisms, and of the special physiological responses and adjustments of the individual during high-altitude flight. Lectures, conferences, laboratory. Prerequisites: M261-262 or equivalent. 4 units.
PROFESSOR HALL AND ASSISTANT PROFESSOR SALZANO

M369. PHARMACOLOGY. MODE OF ACTION OF DRUGS.—Studies and discussions of the pharmacological action of drugs in terms of biochemical and physiological processes. Lectures, conferences, and laboratory. Prerequisites: M261-262 or equivalent. 4 units. PROFESSORS F. BERNHEIM AND RENKIN, ASSOCIATE PROFESSOR DETURK, ASSISTANT PROFESSOR OTTOLENGHI

M370. SEMINAR.—A weekly meeting in which original researches by members of the staff and guests are reported. Required of all graduate students who are candidates for the M.A. or Ph.D. degree. 2 units.
ALL MEMBERS OF THE GRADUATE STAFF

M371. TOPICS IN PULMONARY AND CARDIOVASCULAR PHYSIOLOGY.—This course is concerned with processes which account for exchange of gases with the atmosphere, aeration of the blood, transport of oxygen and carbon dioxide, and exchange of gases at the tissues. Emphasis is placed on classical experiments describing physical factors in thoracic motion, ventilation-perfusion relations, function of hemoglobin as carrier of oxygen and carbon dioxide, flow-pressure relations in the gas and blood streams, and factors which disturb the exchange of gases in the pulmonary and systemic capillaries. Prerequisites: M261-262 or equivalent. 2 units. ASSOCIATE PROFESSORS HULL AND LONG, ASSISTANT PROFESSOR SALZANO

M372. RESEARCH.—Individual investigations in the various fields of physiology. Credits to be arranged. ALL MEMBERS OF THE GRADUATE STAFF

M373. CELLULAR ENDOCRINOLOGY.—Current concepts of the mechanism of action of hormones are covered with special reference made to the effects of hormones on cell membrane permeability and on the activity of enzyme systems. The relationships of these cellular actions of hormones to the hormonal regulation of growth, metamorphosis, osmoregulation, pigmentation and reproduction are discussed. 2 units. ASSOCIATE PROFESSOR KOSTYO

M375. PHYSIOLOGY OF EXCITABLE CELLS.—This course includes the following topics: Membrane circuit diagrams and cable properties; Energy storage and discharge in nerve, muscle; Membrane non-linear voltage-current relations; Axonal and junctional transmission; Cellular organization and electrical activity in skeletal, cardiac and smooth muscle; Electro-mechanical coupling; Thermodynamics of muscle; Mechanics of muscular contraction; and Molecular basis of contraction. 2 units. ASSOCIATE PROFESSORS HOROWICZ AND MOORE

M377. CELLULAR TRANSPORT PROCESSES.—A sequential study of the following topics: The physical chemistry of transport processes which occur in living cells (e.g. diffusion, flow, electric current); contemporary knowledge of the molecular mechanism of salt and water transport across cell membranes with special reference to the conversion of chemical bond energy to transport work in active transport; the integration of transport processes in individual plasma membranes to accomplish regulation of cytoplasmic salt and water composition and cell volume, as well as the secretion of fluids across epithelial cell layers in organs specialized for this function (intestine, kidney). 2 units.

PROFESSOR TOSTESON, ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN, ASSISTANT PROFESSOR MCMANUS

## POLITICAL SCIENCE

PROFESSOR RANKIN, CHAIRMAN—308 LIBRARY; PROFESSOR WILSON, DIRECTOR OF GRADUATE STUDIES—405 LIBRARY; PROFESSORS BRAIBANTI, COLE, CONNERY, AND HALLOWELL; VISITING PROFESSOR KULSKI; ASSOCIATE PROFESSORS LEACH, PROCTOR, AND SINDLER

The Department of Political Science offers graduate work leading to the A.M. and Ph.D. degrees. Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree.

Instruction is designed to prepare the student for teaching, for government service, and for other work related to public affairs. Before undertaking graduate study in political science, a student is ordinarily expected to have completed at least 12 semester hours of course work in political science, including some work in American government.

Fields of political science in which instruction is at present offered for candidates for the degree of Doctor of Philosophy are the following: American Government and Constitutional Law; Comparative Government (with special reference to European Institutions, Southern Asia, or Commonwealth Institutions); Political Theory; American State and Local Government; International Law and Organization; Public Administration; Political Parties and Voting Behavior. Candidates for the degree of Doctor of Philosophy who propose to major in political science must elect five fields including Comparative Government and Political Theory; at least one of the five fields must be taken in a department other than the Department of Political Science.

FOR SENIORS AND GRADUATES

207. AMERICAN CONSTITUTIONAL LAW AND THEORY.—A study of leading principles of American government, as developed through judicial interpretation of the Constitution. 3 units. PROFESSOR RANKIN

208. AMERICAN CONSTITUTION LAW AND CURRENT NATIONAL PROBLEMS.—A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 units.

PROFESSOR RANKIN

209. PROBLEMS IN STATE AND LOCAL GOVERNMENT IN THE UNITED STATES.—A study of the historical development of the state and local governments, their present organization and subdivisions and their relation to each other. Special

attention is given to the position of the states in the federal union through the study of federal-state, inter-state, and state-local relation. 3 units.

PROFESSOR RANKIN

221. INTERNATIONAL PUBLIC ORGANIZATION.—A study of the structure and functioning of the United Nations organs, of related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 units. PROFESSOR WILSON

223. POLITICAL THOUGHT TO THE SEVENTEENTH CENTURY.—A survey from the time of Plato to the close of the seventeenth century; Graeco-Roman, Patristic and German thought; individualism and cosmopolitanism; effect of the Church-State controversy and the conciliar movement; medieval constitutionalism; legislative sovereignty. 3 units. PROFESSORS HALLOWELL AND WILSON

224. MODERN POLITICAL THEORY.—An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 units. PROFESSOR HALLOWELL

225. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 units.

PROFESSOR COLE AND ASSOCIATE PROFESSOR PROCTOR

226. COMPARATIVE GOVERNMENT AND POLITICS.—A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 units.

PROFESSOR COLE AND ASSOCIATE PROFESSOR PROCTOR

227-228. INTERNATIONAL LAW.—Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 units.

PROFESSOR WILSON

229. RECENT AND CONTEMPORARY POLITICAL THEORY.—The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 units. PROFESSOR HALLOWELL

230. AMERICAN POLITICAL INSTITUTIONS.—A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics, this course is concerned with the Constitutional Convention of 1787, and the development of Congress, the Presidency, and the Supreme Court. 3 units. PROFESSOR RANKIN

231. AMERICAN POLITICAL THEORY.—An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 units.*

PROFESSOR HALLOWELL

234. CIVIL-MILITARY RELATIONSHIPS IN AMERICAN GOVERNMENT.—A consideration of the role of the military in American government both in practice and in theory. Special emphasis will be given to formal civil-military structural arrangements for determining policies such as the National Security Council, and to the degree of civilian control within the military establishment. 3 units.*

PROFESSOR CONNERY

235. THE BRITISH COMMONWEALTH.—An analysis of the political relationships between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. A course designed in part to utilize the occasional services of visiting professors from Commonwealth countries. 3 units. PROFESSOR COLE

241. ADMINISTRATIVE MANAGEMENT.—An advanced course in public administration with special attention being given to the development of scientific

management, its application to government in the United States, and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 units. PROFESSOR CONNERY

242. NATIONAL ADMINISTRATION.—A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 units.
PROFESSOR CONNERY

244. ADMINISTRATIVE LAW AND PROCESS.—The nature and law of the administrative process in the context of American government and politics, with special attention to the powers, procedures, and judicial control of administrative agencies. 3 units. ASSOCIATE PROFESSOR HALL

246. GOVERNMENT ADMINISTRATION AND PUBLIC POLICY.—Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in the field of public policy, and their possible solution. 3 units. PROFESSOR CONNERY

250. COMPARATIVE GOVERNMENT AND POLITICS—SOUTHERN ASIA I.—Political development of the Indo-Pakistan subcontinent until the partition of 1947 and the development of India after that date. Attention will be given to the structure of Indian society and to political problems under British rule. Principal emphasis will be on the development of India as an independent state and on the relationship of politics to economic development. 3 units. PROFESSOR BRAIBANTI

251. COMPARATIVE GOVERNMENT AND POLITICS—SOUTHERN ASIA II.—A continuation of Political Science 250 with chief emphasis on the political development of Pakistan since 1957. Comparative analysis of India and Pakistan. Some attention will also be given to Ceylon and Malaya, as members of the Commonwealth. 3 units. PROFESSOR BRAIBANTI

252. COMPARATIVE GOVERNMENT AND POLITICS—JAPAN.—A survey of the civilization of Japan, and an analysis of political institutions from the Taikwa Reforms to the modern period. 3 units. PROFESSOR BRAIBANTI

260. SOVIET GOVERNMENT.—An analysis of the Soviet State and party structure and policies, of their relations to other public organizations and of their impact on the situation of the Soviet individual. The analysis will include a study of the Party policies toward the intelligentsia, the workers, and the peasants. 3 units.
VISITING PROFESSOR KULSKI

275. THE NATIONAL PARTY SYSTEM.—An intensive examination of selected facets of American national political parties, such as relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 units. ASSOCIATE PROFESSOR SINDLER

276. COMPARATIVE STATE PARTIES AND POLITICS.—A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organization, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 units. ASSOCIATE PROFESSOR SINDLER

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 3 units.* ASSOCIATE PROFESSOR LEACH

292. MUNICIPAL ADMINISTRATION.—A study of principles and methods relating to municipal administration in the United States. 3 units.*
PROFESSOR RANKIN AND ASSOCIATE PROFESSOR LEACH

FOR GRADUATES

301-302. DEPARTMENTAL GRADUATE SEMINAR.—An introduction to research methodology, inter-disciplinary relationships, and current research problems. Required of all graduate majors in political science. No credit.
ALL MEMBERS OF THE GRADUATE STAFF

310. SEMINAR IN STATE GOVERNMENT.—Open to students who have completed course 209 or its equivalent. 3 units. PROFESSOR RANKIN

321. SEMINAR IN POLITICAL THEORY.—Open to students who have completed 6 units in Political Science 223, 224, 229, 231 or their equivalents. 3 units.
PROFESSOR HALLOWELL

325. SEMINAR IN COMPARATIVE GOVERNMENT.—Open to students who have completed courses 225 or 226 or equivalents. 3 units. PROFESSOR COLE

328. SEMINAR IN INTERNATIONAL LAW.—Open to students who have completed course 227-228 or its equivalent. 3 units. PROFESSOR WILSON

330. SEMINAR IN ASIAN COMPARATIVE GOVERNMENT AND POLITICS.—Emphasis on the comparative political development of India, Pakistan, Japan and other selected Asian nations. Some attention will be given to recent developments in the methodology of analyzing Asian politics. 3 units.
PROFESSOR BRAIBANTI

341. SEMINAR IN PUBLIC ADMINISTRATION.—Directed reading, discussion and reports concerning the theory and practice of public administration. 3 units.
PROFESSOR CONNERY

360 SEMINAR IN RUSSIAN GOVERNMENT.—Open to students who have completed course 226 or 260, or on individual approval by the instructor. 3 units.
VISITING PROFESSOR KULSKI

376. SEMINAR IN POLITICAL BEHAVIOR.—Open to students who have completed courses 275 and 276 or their equivalents, or by special approval of the instructor. 3 units. ASSOCIATE PROFESSOR SINDLER

401. SEMINAR IN THE BRITISH COMMONWEALTH.—3 units.
PROFESSORS COLE, HAMILTON, SPENGLER, AND BRAIBANTI

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN.—3 units.
PROFESSOR BRAIBANTI AND ASSOCIATES

RELATED COURSE WORK IN THE SCHOOL OF LAW

There may be graduate credit for course work completed in the Duke University School of Law, under regulations referred to on page 22 of this *Bulletin*.

## PSYCHOLOGY

PROFESSOR ZENER, CHAIRMAN, 224 PSYCHOLOGY-SOCIOLOGY BUILDING; PROFESSOR GUTTMAN, DIRECTOR OF GRADUATE STUDIES, 103 PSYCHOLOGY-SOCIOLOGY BUILDING; PROFESSORS ADAMS, ALEXANDER, DAI, DIAMOND, JONES, KIMBLE, AND KOCH; ASSOCIATE PROFESSORS BANHAM, BONEAU, BORSTELMANN, BREHM, REICHENBERG-HACKETT, AND WALLACH; ASSOCIATE RESEARCH PROFESSOR GAFFRON; ASSISTANT PROFESSORS ALTROCCHI, CARSON, ERICKSON, GREENWOOD, KREMEN, LAKIN, OBRIST, AND SCHIFFMAN; LECTURERS COHEN, CROVITZ, EISDORFER, GEHMAN, SHMAVONIAN, AND SOMJEN; VISITING ASSOCIATE PROFESSORS SCHÖNBACH (1963-64) AND SPERLING (SPRING, 1964)

The Department offers work leading to the A.M. and Ph.D. degrees. For the Ph.D. degree the areas of concentration are: theoretical experimental psychology, including physiological and comparative psychology; social psychology; and personality clinical psychology. All fields of specialization presuppose thorough preparation in the general methods, data, and theories of psychology. Programs of study are typically arranged to provide this common background in the first year or two, with increasing specialization in course work and research in subsequent years. Early in the second year of residence, the Ph.D. student is expected to have planned his further program of specialized studies; by the end of the second year, when the preliminary examination is normally taken, the doctoral dissertation plan should be formulated. An original dissertation demonstrating independent research competence and scholarship is the most important formal requirement for the Ph.D. degree.

Students specializing in clinical psychology undertake field work in a variety of settings, and an integral part of this program is a one-year internship in an approved and appropriate institution. Clinical internship is arranged for the third year of study or later year, depending on the student's progress and needs.

Minor work in a variety of fields is available, but the areas most relevant to graduate work in psychology are the biological sciences (zoology, neuroanatomy, physiology), mathematics and statistics, sociology and anthropology, and philosophy of science.

Further details concerning the program of studies in psychology may be obtained from the Director of Graduate Studies in Psychology.

201, 202. THE FIELD OF PSYCHOLOGY.—A survey of representative theoretical and empirical problems drawn from all levels of psychological functioning. 3 units each semester. PROFESSOR GUTTMAN AND GRADUATE STAFF

203. PSYCHOLOGY OF PERCEPTION.—An examination of current systematic formulations with emphasis upon the intensive analysis of a variety of representative investigations. 3 units. PROFESSOR ZENER

204. COMPARATIVE PSYCHOLOGY.—The study of behavior as related to species and of speciation as dependent upon behavior; instinct, imprinting and learning at different phylogenetic levels. 3 units. PROFESSOR ADAMS

209. EXPERIMENTAL METHODS IN PSYCHOLOGY.—A study of methods for the identification, control, and recording of essential variables in psychological situations, with emphasis upon the relation of experimental techniques to problem formulation. Laboratory, lectures, and discussions. 3 units. PROFESSOR KIMBLE

210. COGNITION AND HIGHER MENTAL PROCESSES.—An intensive analysis of the literature on thinking, problem-solving, creativity, language and related topics. Emphasis is upon the functional significance of these aspects of intellectual activity and upon the experimental methodology involved in their study. 3 units. ASSOCIATE PROFESSOR BONEAU

213, 214. CONDITIONING AND LEARNING.—A survey of the literature on classical and instrumental conditioning and other forms of sample learning. Emphasis is on classical conditioning in 213 and on instrumental behavior in 215. 6 units. PROFESSORS GUTTMAN AND KIMBLE

215. DEVELOPMENTAL PSYCHOLOGY.—A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. 3 units. ASSOCIATE PROFESSOR BORSTELMANN

216. BIOLOGICAL PSYCHOLOGY.—The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy and genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potentials, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 units. PROFESSOR DIAMOND

217. RESEARCH METHODS IN SOCIAL PSYCHOLOGY.—Presents the theory and practice of data collection methods in social psychology. Emphasis is on the interplay between design and technique. The methods covered include formal scaling procedures, systematic observational techniques and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 units. ASSOCIATE PROFESSOR BREHM

218. SOCIAL PSYCHOLOGY.—An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 units. PROFESSOR JONES

234. SEMINAR IN PERSONALITY.—A detailed consideration of selected research topics of current interest in the experimental study of personality, including risk-taking, creativity, and cognitive styles. Prerequisites: Psychology 245 and 246 or equivalent. 3 units.

236. THEORETICAL PSYCHOLOGY.—This course is devoted to the analysis of techniques of theory construction in psychology. The discussion of these methodological issues is co-ordinated with the analysis of concrete formulations in contemporary psychological theory. 3 units. PROFESSOR KOCH

237. FUNCTIONAL NEUROPHYSIOLOGY.—This course considers the mecha-

nisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural systems, and the integrative and associative functions of the nervous system. Laboratory demonstrations and participation. 3 units. ASSISTANT PROFESSOR ERICKSON

238. THE ELECTROENCEPHALOGRAM AND PSYCHOLOGICAL FUNCTION.—A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, conditioning and learning. Lectures, laboratory demonstrations and clinical case presentations. 3 units. ASSISTANT PROFESSOR OBRIST

245, 246. PERSONALITY THEORY.—An examination of representative models of human functioning from Freud to the present day. Included are examples from psychoanalytical, field theoretical, and behavioristic approaches. 3 units each semester. PROFESSOR ALEXANDER AND ASSISTANT PROFESSOR KREMEN

247, 248. PERSONALITY ASSESSMENT.—Introduction to the assessment of human personality through the study of personal documents, interview data, objective and projective test material. Laboratory sessions will be concerned with personality assessment of normal human subjects over extended time periods. 3 units each semester. PROFESSOR ALEXANDER AND ASSISTANT PROFESSOR KREMEN

253, 254. PERSONALITY DEVELOPMENT.—A survey of behaviors and concepts relating to personality functioning through the life span from infancy to old age. Laboratory sessions will involve the study of individuals in natural and experimental contexts by observation and testing. 3 units each semester.
ASSOCIATE PROFESSOR BORSTELMANN AND STAFF

265. FUNDAMENTAL STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—Introduction to probability and the use of statistics in description and hypothesis testing in psychology including the following applications: correlation techniques, chi-square and t tests, distribution-free tests and one-way analysis of variance. Prerequisite: Psychology 117-118 or equivalent. 3 units.
ASSOCIATE PROFESSOR BONEAU

266. ADVANCED STATISTICAL APPLICATIONS IN PSYCHOLOGICAL RESEARCH.—The basic theory and applications of analysis of variance techniques to complex experimental designs will be covered. Additional advanced techniques, including factor analysis, will be introduced. Prerequisite: Psychology 265 or equivalent. 3 units. (First semester.) ASSOCIATE PROFESSOR BONEAU

271. SEMINAR IN SELECTED PROBLEMS.—3 units. (Spring, 1964: Psycholinguistics.) VISITING ASSOCIATE PROFESSOR SCHÖNBACH

273. PRINCIPLES OF PSYCHOLOGICAL MEASUREMENT.—Psychological measurement will be discussed in the context of the theoretical questions which motivate research, and the related demands of scientific inference. Topics will include methods of psychometric scaling and test construction, as well as selected methods for data analysis. Prerequisite: Psychology 265 or equivalent. 3 units.
ASSISTANT PROFESSOR SCHIFFMAN

282. INTRODUCTION TO METHODS IN PSYCHOTHERAPY.—Current trends in psychotherapeutic practice and research are discussed, as a means of introducing the student to the field. Emphasis is upon the application of principles drawn from theories of personality to individual and group psychotherapy. Discussions of selected readings and some field experience in therapy are included. 3 units. ASSISTANT PROFESSOR LAKIN

292. THE HISTORY OF PSYCHOLOGY.—3 units. PROFESSOR ADAMS

293. SENSATION AND PERCEPTION.—The development of exact, comprehensive methods in the study of sensory physiology and psychology. Introduction to linear theory, its application to the description of the stimulus, sensory transducers and neuron networks. Theories of thresholds, detection, sensory and multidimensional scaling. Selected problems in the perception of objects and complex events. Memory. Emphasis will be on the visual modality. 3-5 units. (Spring Semester, 1964.) VISITING ASSOCIATE PROFESSOR SPERLING

FOR GRADUATES

305. PSYCHOPATHOLOGY.—An examination of behavior disorders, with particular emphasis on explanatory concepts and the evidence from research in this field. 3 units. ASSOCIATE PROFESSOR COHEN

306. SEMINAR IN DEVELOPMENTAL PSYCHOLOGY.—2 or 3 units. PROFESSOR ADAMS

309. SEMINAR IN LEARNING.—3 units. PROFESSOR KIMBLE

310. SEMINAR IN PERCEPTION.—3 units. PROFESSOR ZENER

311. SEMINAR IN INSTRUMENTAL BEHAVIOR.—3 units. PROFESSOR GUTTMAN

312. SEMINAR IN THEORETICAL PSYCHOLOGY.—3 units. PROFESSOR KOCH

316. SEMINAR IN SOCIAL PSYCHOLOGY.—3 units. PROFESSOR JONES

318. SEMINAR IN SOCIAL INFLUENCE.—3 units. ASSOCIATE PROFESSOR BREHM

324. SEMINAR: BEHAVIORAL STUDIES OF THE BRAIN—3 units. PROFESSOR DIAMOND

335-336. CLINICAL PSYCHOLOGY PRACTICUM.—Seminar discussion and supervised field experience in the application of basic psychological procedures and principles to clinical cases in a variety of institutional settings. Prerequisite: Psychology 221-222. 3 units each semester. PROFESSOR ALEXANDER AND STAFF

337. SEMINAR IN SENSORY DISCRIMINATION.—A study of the neural bases of discrimination. 3 units. ASSISTANT PROFESSOR ERICKSON

341. PRINCIPLES OF PSYCHOTHERAPY, I.—Contributions from psychoanalysis, psychology and social sciences will be reviewed to form a unified framework for understanding and treatment of behavior disorders. Emphasis on the problems characteristic of man living in society and culture and on principles of psychotherapy required by the human needs for consistency, self-esteem and self-realization. Selected case material will be used. Prerequisite: Psychology 282. 3 units. PROFESSOR DAI

342. PRINCIPLES OF PSYCHOTHERAPY, II.—Application of principles of psychotherapy in a detailed examination of interviews conducted by students. Emphasis on the role of therapist's personality in the therapy process and on problems of technique. Prerequisite: Psychology 341. 3 units. PROFESSOR DAI

343, 344. ADVANCED SEMINAR IN CLINICAL PSYCHOLOGY.—3 units. ALL MEMBERS OF THE CLINICAL STAFF

371. PRE-SCHOOL BEHAVIOR PROBLEMS.—The diagnostic evaluation of behavior development in infants and preschool children. The nature and causation of developmental anomalies. (Physical handicaps and social conditions in relation to intellectual and personality development.) Preventive and remedial measures. 3 units. ASSOCIATE PROFESSOR BANHAM

## RELIGION

PROFESSOR BEACH, DIRECTOR OF GRADUATE STUDIES—307 DIVINITY SCHOOL; PROFESSORS ANDERSON, CLARK, CUSHMAN, PETRY, PRICE, AND STINESPRING; ASSOCIATE PROFESSORS BAKER, HENRY, HERZOG, LACY, POTEAT; ASSISTANT PROFESSORS HILLERBRAND, GRISLIS, OSBORN, ROBINSON, STRUGNELL, AND SULLIVAN; LECTURER WINTERMUTE

The Department of Religion offers graduate work leading to the A.M. and Ph.D. degrees. Students may major in one of three fields: (1) Biblical Studies; (2) Historical Studies; and (3) Systematic and Contemporary Studies. They will be expected to take such courses in one or both of the other fields as will conduce to an adequate understanding of their chosen fields of specialization.

In addition to course work in these major fields, students will take such other courses in cognate fields as will contribute to the enrichment of their major studies.

This minor requirement may be fulfilled either by work in a cognate department, such as Ancient Language and Literature, History, or Political Science, or by work in a cognate field within the Department of Religion other than the field of major concentration.

The program of doctoral studies presumes a grounding in religion such as is normally derived from the course content of theoretical subjects of a seminary curriculum. Candidates for admission to the doctoral program are favored, therefore, who hold a B.D. degree from an accredited seminary or who have had at least two years of seminary study beyond the B.A. degree. Students applying for graduate

work in religion directly from an undergraduate program should have had a strong undergraduate major in religion, and will be accepted for the Ph.D. program only on the condition of satisfactory completion of the M.A. degree with the department.

Candidates for the Ph.D. degree must complete the language requirements in both French and German not later than the beginning of the second year of residence.

## FIELD I. BIBLICAL STUDIES

201-202. FIRST HEBREW.—The principles and structure of the Hebrew language with translation of selected Old Testament narratives. 6 units.
PROFESSOR STINESPRING

207. SECOND HEBREW.—Historical Hebrew grammar with reading and exegesis of Old Testament prose (the Pentateuch and historical books in alternate years). First semester. 3 units. STAFF

208. SECOND HEBREW.—Historical Hebrew grammar with reading of Old Testament poetry (the Prophets and the Writings in alternate years). Second semester. 3 units. STAFF

209. BIBLICAL THEOLOGY.—A study of the Old and New Testaments in regard to their theological relationship. 3 units. PROFESSOR ANDERSON

217. THE NEW TESTAMENT IN GREEK.—Extensive reading of the Greek text of the New Testament, with special emphasis upon its interpretation. 3 units.

226. EXEGESIS OF THE GREEK NEW TESTAMENT I.—A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) 3 units.
PROFESSOR PRICE

227. EXEGESIS OF THE GREEK NEW TESTAMENT II.—A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) 3 units. PROFESSOR ANDERSON

228. THE THEOLOGY OF THE GOSPEL AND EPISTLES OF JOHN.—A study of the origin of these writings; the provenance of their thought forms and symbolism; their influence on the early church; and contemporary significance. 3 units. PROFESSOR PRICE

301. THE THEOLOGY OF THE DEAD SEA SCROLLS.—A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. 3 units. ASSISTANT PROFESSOR STRUGNELL

302. STUDIES IN THE INTERTESTAMENTAL LITERATURE.—Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to Post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 units. PROFESSOR ANDERSON

304. ARAMAIC.—A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 units.
PROFESSOR STINESPRING AND ASSISTANT PROFESSOR STRUGNELL

305. THIRD HEBREW.—An interpretative study of late Hebrew prose, with readings from Chronicles, Ecclesiastes, and the Mishnah. 3 units.
PROFESSOR STINESPRING

306. LANGUAGE AND LITERATURE OF THE DEAD SEA SCROLLS.—A study in interpretation. Prerequisite, a knowledge of Hebrew. 3 units.
ASSISTANT PROFESSOR STRUGNELL

307. SYRIAC.—A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 units. PROFESSOR STINESPRING

309. HISTORY OF THE ANCIENT NEAR EAST.—A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 units. PROFESSOR STINESPRING

310. OLD TESTAMENT PROPHECY.—The prophetic movement in Israel

with special emphasis on the theological standpoint of the prophets of the eighth century B.C. 3 units. PROFESSOR STINESPRING

317. THE SYNOPTIC GOSPELS.—A detailed study of their characteristics and contents, based upon the Greek text, with attention to their respective sources and to the development of synoptic criticism. 3 units.

318. TEXTUAL CRITICISM OF THE NEW TESTAMENT.—A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. 3 units. PROFESSOR CLARK

340-341. SEMINAR IN THE NEW TESTAMENT.—Research and discussion on a selected problem in the Biblical field. 2 units. PROFESSORS ANDERSON AND PRICE

## FIELD II. HISTORICAL STUDIES

234. THE THEOLOGY OF THOMAS AQUINAS.—A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 units. ASSISTANT PROFESSOR GRISLIS

240. THE THEOLOGY OF RICHARD HOOKER.—An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 units. ASSISTANT PROFESSOR GRISLIS

250. STUDIES IN MODERN CHURCH HISTORY, I. REFORMATION AND COUNTER-REFORMATION.—History and thought of European Christianity between 1517-1680. 3 units. ASSISTANT PROFESSOR HILLERBRAND

251. STUDIES IN MODERN CHURCH HISTORY, II: PIETISM AND RATIONALISM.—History and thought of Christianity on the continent of Europe between 1680-1800. 3 units. ASSISTANT PROFESSOR HILLERBRAND

260. SEMINAR: WESLEY STUDIES.—The lives and thought of John and Charles Wesley and their colleagues in relation to English culture and religion in the 18th century. 3 units. ASSOCIATE PROFESSOR BAKER

280. THE HISTORY OF RELIGIONS.—A study of the methodology of the history of religions, the nature of religious experience, and specific categories of religious phenomena. 3 units. ASSISTANT PROFESSOR SULLIVAN

285. ORIGINS OF INDIAN CIVILIZATION.—A study of the main sources and traditions of the classical civilization of the Indian sub-continent, with particular attention to religious movements and institutions. (Also listed as History 285.) 3 units. ASSISTANT PROFESSOR SULLIVAN

296. RELIGION ON THE AMERICAN FRONTIER.—A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. 3 units. ASSOCIATE PROFESSOR HENRY

322. NINETEENTH-CENTURY EUROPEAN THEOLOGY.—Protestant theology from Kant to Herrman together with representative British theologians. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR HERZOG

331. THE SOCIAL MESSAGE OF THE EARLY AND MEDIEVAL CHURCH.—A study of the social teachings and contributions of the Christian Church prior to the Protestant Reformation. 3 units. (Not 1964-65) PROFESSOR PETRY

332. THE MEDIEVAL CHURCH.—Outstanding characteristics of the Medieval Church, emphasizing theory, polity, institutions, sacraments, and worship. 3 units. PROFESSOR PETRY

334. CHURCH REFORMERS AND CHRISTIAN UNITY.—The work of such reformers as Marsilius of Padua, William Ockham, Jean Gerson, Pierre d'Ailly, and Nicholas of Cusa in relation to ecclesiastical schism and the search for Christian unity through representative councils. 3 units. (Not 1964-65) PROFESSOR PETRY

336. CHRISTIAN MYSTICISM IN THE MIDDLE AGES.—Source studies in historical perspective of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. 3 units. PROFESSOR PETRY

337. THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 3 units. ASSISTANT PROFESSOR HILLERBRAND

338. THE THEOLOGY OF JOHN CALVIN.—An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. 3 units.
ASSISTANT PROFESSOR GRISLIS

339. LEFT-WING MOVEMENTS OF THE REFORMATION.—A survey of the history and theology of the "radical" Reformation. 3 units. (Not 1964-65)
ASSISTANT PROFESSOR HILLERBRAND

387. CHRISTIAN ETHICS AND SOCIAL PHILOSOPHY.—Selected social philosophies from Locke to Sumner analyzed from the standpoint of Christian ethics. 3 units. ASSOCIATE PROFESSOR LACY

391. HISTORICAL TYPES OF CHRISTIAN ETHICS I.—A critical study of representative statements of Christian ethical theory, through the early Reformation. 3 units. (Not 1964-65) PROFESSOR BEACH

392. HISTORICAL TYPES OF CHRISTIAN ETHICS II.—A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 units. (Not 1964-65) PROFESSOR BEACH

395. CHRISTIAN THOUGHT IN COLONIAL AMERICA.—Exposition of the main currents in Protestant theology. 3 units. ASSOCIATE PROFESSOR HENRY

396. LIBERAL TRADITIONS IN AMERICAN THEOLOGY.—A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 units. ASSOCIATE PROFESSOR HENRY

## FIELD III. SYSTEMATIC AND CONTEMPORARY STUDIES

230. THE MEANING OF RELIGIOUS LANGUAGE.—An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. 3 units. ASSOCIATE PROFESSOR POTEAT

231. SEMINAR IN CHRISTIANITY AND CONTEMPORARY THOUGHT.—Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relevance for theological inquiry. 3 units. ASSOCIATE PROFESSOR POTEAT

248. THE THEOLOGY OF KARL BARTH.—An historical and critical study of the theology of Karl Barth. 3 units. ASSISTANT PROFESSOR OSBORN

292. CHRISTIAN ETHICS AND INTERNATIONAL RELATIONS.—An examination of Christian attitudes toward such issues as war and peace, the rule of law, foreign aid, and human rights; and the Church's contribution to international policies and institutions. 3 units. ASSOCIATE PROFESSOR LACY

303. DOGMA AND THE PROBLEM OF HISTORY.—The authority of Kerygma and the Word of God in contemporary European theology. 3 units.
ASSOCIATE PROFESSOR HERZOG

320. SEMINAR: SCHLEIERMACHER.—A critical examination of the dogmatic system. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR HERZOG

325. PHILOSOPHICAL THEOLOGY I.—Main problems in the history of philosophical theology. 3 units. PROFESSOR CUSHMAN

326. PHILOSOPHICAL THEOLOGY II.—Prolegomena to the system of Christian theology. 3 units. PROFESSOR CUSHMAN

328. TWENTIETH-CENTURY EUROPEAN THEOLOGY.—Critical examination of the thought of selected representative theologians. 3 units.
ASSOCIATE PROFESSOR HERZOG

333. SEMINAR: MARXIST IDEOLOGY AND CHRISTIAN FAITH.—Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. 3 units. ASSOCIATE PROFESSOR LACY

380. EXISTENTIALISM.—An exploration of the interests and motifs of Existentialism in relation to modern philosophy and theology through an analysis of representative writings of Kierkegaard, Heidegger, Berdyaev, Marcel, and Sartre. 3 units. ASSOCIATE PROFESSOR POTEAT

385. RELIGION IN AMERICAN LITERATURE.—A critical study of the meaning and value of religious motifs reflected in American literature. 3 units.
ASSOCIATE PROFESSOR HENRY

386. SEMINAR: THEOLOGICAL TRENDS IN THE WORLD CHURCH.—Contemporary currents of Christian thoughts as they affect resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 units.
ASSOCIATE PROFESSOR LACY

389. CHRISTIAN ETHICS AND CONTEMPORARY CULTURE.—A study of the interaction between Christian thought and current secular social theory. 3 units.
PROFESSOR BEACH

390. CURRENT PROBLEMS IN CHRISTIAN ETHICAL THEORY.—A critical study of dominant issues in Christian ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community, and vocation. 3 units.
PROFESSOR BEACH

394. CHRISTIANITY AND THE STATE.—The relation of the Christian theory of the State to political problems, with special consideration of the religious assumptions underlying democratic theory and practice and of the relationship of church to state. 3 units.
PROFESSOR BEACH

397. CONTEMPORARY AMERICAN THEOLOGY.—Critical appraisal of major tendencies. 3 units.
ASSOCIATE PROFESSOR HENRY

398. COLLOQUIUM OF THE COLLEGE AND UNIVERSITY TEACHING OF RELIGION.—The theological issues of religion in higher education; a consideration of the curricular content of religion courses. Normally expected of Level III students in Fields I, II, and III in residence.
PROFESSOR BEACH AND STAFF

## ROMANCE LANGUAGES

PROFESSOR DAVIS, CHAIRMAN—214 CARR; PROFESSOR CHERPACK, DIRECTOR OF GRADUATE STUDIES—201 CARR; PROFESSORS CASTELLANO, DOW, FEIN, PREDMORE, AND WARDROPPER; ASSOCIATE PROFESSORS CORDLE, GRANT, AND VINCENT; ASSISTANT PROFESSORS HULL AND TÉTEL

The Department of Romance Languages offers graduate work leading to the A.M. and Ph.D. degrees. In order to undertake graduate study in this Department, the student should normally have credit for four years of college courses in the chosen language, or 18 semester hours beyond the conventional two units offered at entrance to college. In addition to this minimum requirement, the student should have had one semester of review in composition and grammar.

It is recommended that candidates for the A.M. degree take a second Romance language as the minor subject.

A candidate for the Ph.D. degree will be required to take some training in Romance linguistics, the amount to be determined by the Department upon consideration of the student's preparation in the field, and a course in the methods of literary scholarship.

### FRENCH

FOR SENIORS AND GRADUATES

209. ADVANCED COMPOSITION AND SYNTAX.—A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 units.
ASSISTANT PROFESSOR HULL

210. FRENCH PHONETICS.—The phonemic structure of contemporary French. Sounds, intonation. Practice transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 units.
ASSISTANT PROFESSOR HULL

213. FRENCH CLASSICISM.—Its initial phase. Reading from Malherbe, Balzac, Voiture, Descartes, Corneille, Molière, and others. 3 units. (1964-65)
PROFESSOR CHERPACK

214. FRENCH CLASSICISM.—Its maturity. Readings from Pascal, Racine, La Fontaine, La Rochefoucauld, Boileau, Bossuet, Madame de Sévigné. La Bruyére, Saint-Simon, and others. 3 units. (1964-65)
PROFESSOR CHERPACK

219. OLD FRENCH LITERATURE.—An introduction to the reading of Old French literary texts. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR VINCENT

221. THE NINETEENTH-CENTURY FRENCH NOVEL.—Its initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 units. (1964-65) ASSOCIATE PROFESSOR GRANT

222. THE NINETEENTH-CENTURY FRENCH NOVEL.—Its continuation. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 units. (1964-65) ASSOCIATE PROFESSOR GRANT

225, 226. FROM RENAISSANCE TO BAROQUE IN FRENCH LITERATURE OF THE SIXTEENTH CENTURY.—First semester: Literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: Poetry and theater. Readings from Marot, Scève, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. (1964-65) ASSISTANT PROFESSOR TETEL

241, 242. FRENCH LITERATURE AND THOUGHT IN THE AGE OF ENLIGHTENMENT.—First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: The crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 units. (1964-65) PROFESSOR CHERPACK

245. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—1895-1925: the metamorphoses of symbolism. A study of the works of Proust, Gide, and Claudel. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR CORDLE

246. FRENCH LITERATURE OF THE TWENTIETH CENTURY.—1925-1955: The existentialist conversion. A study of the work of Malraux, Sartre, Camus. 3 units. (Not 1964-65) ASSOCIATE PROFESSOR CORDLE

FOR GRADUATES

311, 312. FRENCH SEMINAR.—Each semester one of the following topics will be selected for intensive treatment: (a) Studies in Sixteenth-Century Literature, (b) Studies in Eighteenth-Century Literature, (c) Studies in Nineteenth-Century Literature, (d) Studies in Seventeenth-Century French Literature, (e) Studies in Contemporary Literature. 3 units each semester.
PROFESSOR CHERPACK; ASSOCIATE PROFESSORS CORDLE AND GRANT

—.GRADUATE READING COURSE. An intensive course in French to develop rapidly the ability to read French in several fields. Graduate students only. No credit.

## SPANISH

FOR SENIORS AND GRADUATES

251. THE ORIGINS OF THE SPANISH NOVEL.—A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: the *Amadís de Gaula, Diego de San Pedro's La cárcel de amor,* the *Abencerraje,* the *Lazarillo,* Montemayor's *Diana.* 3 units. (Not 1964-65)
PROFESSOR WARDROPPER

252. SPANISH LYRIC POETRY BEFORE 1700.—A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor, la poesía de tipo tradicional,* and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 units. (1964-65) PROFESSOR WARDROPPER

253. THE ORIGINS OF THE SPANISH THEATER.—A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century) through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres Naharro, Lope de Rueda, Juan de la Cueva. 3 units. (Not 1964-65)
PROFESSOR WARDROPPER

255. MODERN LATIN-AMERICAN LITERATURE.—The coming of age of Latin-American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 units. (1964-65) PROFESSOR FEIN

256. CONTEMPORARY LATIN-AMERICAN LITERATURE.—Trends in Latin-American literature after the Modernist movement. Analysis of significant works in various genres. 3 units. (Not 1964-65) PROFESSOR FEIN

258. OLD SPANISH LITERATURE.—An introduction to the reading of Old Spanish literary texts. 3 units. (Not 1964-65) PROFESSOR DAVIS

259. SPANISH PHONETICS.—A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. 3 units.
PROFESSOR CASTELLANO

260. ADVANCED COMPOSITION AND SYNTAX.—Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. 3 units. PROFESSOR CASTELLANO

261. NINETEENTH-CENTURY NOVEL.—A study of literary and social trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo Barzán, Blasco Ibánez, and their contemporaries. 3 units. (1964-65) PROFESSOR DAVIS

264. MODERN AND CONTEMPORARY SPANISH THEATER.—A brief review of modern and contemporary Spanish theater from the period of Romanticism. Lectures, reading and discussion of the most representative works of Benavente, los hermanos Quintero, Garcia Lorca, Casona, etc. 3 units. (1964-65)
PROFESSOR CASTELLANO

265. GOLDEN AGE LITERATURE: CERVANTES.—The life and works of Cervantes with special emphasis on his *Quijote*. 3 units. PROFESSOR PREDMORE

266. GOLDEN AGE LITERATURE: THE DRAMA.—Study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 units. (Not 1964-65) PROFESSOR CASTELLANO

275. CONTEMPORARY SPANISH LITERATURE.—The essay and lyric poetry. A study of the revision of national values and literary expression in the twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extra-peninsular influences. 3 units. (Not 1964-65)
PROFESSOR PREDMORE

276. CONTEMPORARY SPANISH LITERATURE.—The novel. A study of tradition and innovation in the twentieth-century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 units. (Not 1964-65) PROFESSOR PREDMORE

FOR GRADUATES

321, 322. HISPANIC SEMINAR.—Each semester one of the following topics will be selected for intensive treatment: (a) The Spanish Language in America, (b) Studies in Medieval Literature, (c) Studies in the Literature of the Golden Age, (d) Studies in Latin American Literature, (e) Studies in the Spanish Renaissance and Baroque, (f) Studies in Spanish Poetry, (g) Studies in Nineteenth-Century Spanish Literature. 3 units each semester.
PROFESSORS CASTELLANO, DAVIS, FEIN, PREDMORE, AND WARDROPPER

## ROMANCE LANGUAGES

211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 3 units. PROFESSOR CHERPACK

218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 3 units. PROFESSOR DOW

224. ROMANCE LINGUISTICS.—The origin and development of the Romance languages from spoken Latin to the modern standard languages and local dialects. Introduction to contemporary methods in historical and comparative linguistics. 3 units. ASSISTANT PROFESSOR HULL

## RUSSIAN

ASSOCIATE PROFESSOR JEZIERSKI

No graduate degree is presently offered in Russian. The following courses may serve in the minor programs of students in other departments.

201, 202. THE NOVELISTS OF NINETEENTH-CENTURY RUSSIA.—Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English. Lectures, oral reports, class discussions, and term paper. 6 units. ASSOCIATE PROFESSOR JEZIERSKI

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR MCKINNEY, CHAIRMAN—2681 BUILDING #9; ASSOCIATE PROFESSOR KERCKHOFF, DIRECTOR OF GRADUATE STUDIES—271 BUILDING #9; PROFESSORS BACK, LA BARRE AND THOMPSON; ASSOCIATE PROFESSORS MADDOX, PREISS, ROWE, ROY, AND SMITH; ASSISTANT PROFESSORS SIMPSON AND WINSBOROUGH

The Department offers graduate work leading to the A.M. and Ph.D. degrees in Sociology. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. Applicants for admission should submit scores on the Graduate Record Examination.

Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree. Candidates for the Ph.D. degree are expected to have a broad background in the various aspects of sociology—substantive, theoretical, and empirical. The program of each candidate is determined by a committee which reviews his previous work and sets the specific requirements to be met. These requirements will include work in related fields such as psychology, philosophy, mathematics, economics, or political science. Emphasis is placed on the completion of the dissertation, directed by a member of the staff, demonstrating competence and independence in the investigation of an original and significant problem.

Further details of the program, the departmental facilities, the staff, and various stipends available are described in a brochure which may be obtained from the Director of Graduate Studies in Sociology.

FOR SENIORS AND GRADUATES

232. PRIMITIVE RELIGION.—The ethnography, the social functions, and the socio-psychological meanings of religion in primitive societies. 3 units.
PROFESSOR LA BARRE

234. PERSONALITY AND SOCIETY.—The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 units. PROFESSOR LA BARRE

236. PERSONALITY AND CULTURE.—The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comprehensive anthropological materials will be drawn upon. Prerequisite: Course 234. 3 units. PROFESSOR LA BARRE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 units.
ASSOCIATE PROFESSOR ROY AND ASSISTANT PROFESSOR SIMPSON

242. THE SOCIOLOGY OF OCCUPATIONS AND PROFESSIONS.—The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 units. PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR ROY

243. POPULATION DYNAMICS AND SOCIAL CHANGE.—The aim of this course is to introduce the student to the facts and techniques of demographic analysis, and to provide an understanding of the relationship between the demographic structure of society and its social organization. 3 units.
ASSISTANT PROFESSOR WINSBOROUGH

245. DEVIANT SOCIAL BEHAVIOR.—Analysis of deviant behavioral systems (illness, crime, delinquency, etc.) in terms of a) precipitating social factors, b) patterns and goals, c) remedial and counteracting controls. 3 units.
ASSOCIATE PROFESSOR PREISS

247. COMMUNITY AND SOCIETY.—This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, news, mass behavior, social problems, races and classes. 3 units.
PROFESSOR THOMPSON AND ASSISTANT PROFESSOR SIMPSON

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 3 units. PROFESSOR THOMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 3 units.
PROFESSOR THOMPSON

275. SOCIAL ATTITUDES AND INDIVIDUAL BEHAVIOR.—Such issues as the following are considered: the importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the importance of membership groups and reference groups. 3 units. PROFESSOR BACK AND ASSOCIATE PROFESSOR KERCKHOFF

278. SOCIAL STRUCTURE AND THE LIFE CYCLE.—A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 units. ASSOCIATE PROFESSOR MADDOX

281. DEVELOPMENT OF SOCIOLOGICAL THEORY.—An analysis of the development, convergence and utilization of sociological theory. Prerequisite: 15 s.h. credit in sociology. 3 units. PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR PREISS

282. PRINCIPLES OF SOCIOLOGICAL ANALYSIS.—An advanced course in general sociology designed to give a systematic conception of social order, focusing on its structural components and the functions they serve. Undergraduates must have at least 15 s.h. and a B average in sociology and have the permission of the instructor. 3 units.* PROFESSOR THOMPSON

295. METHODOLOGY IN SOCIOLOGY.—Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 units. ASSOCIATE PROFESSOR SMITH

297. STATISTICAL ANALYSIS IN SOCIOLOGY.—Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance and covariance and factorial design are studied. Where possible, analogous non-parametric techniques are also considered. Prerequisite: Mathematics 233 or an equivalent course. Undergraduates must have at least 15 s.h., a B average in sociology and obtain the permission of the instructor. 3 units.
ASSISTANT PROFESSOR WINSBOROUGH

FOR GRADUATES

330. SEMINAR IN ANTHROPOLOGY.—A seminar for advanced students who wish to pursue individual studies in racial and cultural anthropology. Offered both semesters. 1 to 3 units each semester. PROFESSOR LA BARRE AND ASSOCIATE PROFESSOR ROWE

341. SPECIAL PROBLEMS OF COMPLEX SYSTEMS.*
(a) INDUSTRIAL AND PROFESSIONAL SYSTEMS.—Analysis of problems of organization of work in such diverse settings as industrial plants, hospitals, and public administration groups. Problems of decision-making, recruitment, allocation of authority, informal organization, interorganizational relations. 3 units.
PROFESSOR MCKINNEY AND ASSOCIATE PROFESSOR ROY

(b) MASS COMMUNICATIONS.—Theoretical problems in defining and distinguishing communication, communicative acts, communication processes, and communication systems. Work aimed toward the derivation of models and theories for each of these will be pursued. Students must have permission of the instructor or have had at least 6 units in some of the following courses: 142, 171, 172, 275, 373, 374. 3 units. ASSOCIATE PROFESSOR SMITH

(c) URBAN SOCIETY.—Analysis is made of the varying mechanisms through which urban society is integrated, how urbanites develop a sense of identification with the community, and the extent and mode of social dominance of the city in the larger society. 3 units. PROFESSOR THOMPSON AND ASSOCIATE PROFESSOR SMITH

(d) HUMAN ECOLOGY.—An examination of such issues as: the logic and utility of the ecological approach; the possibility of testing current ecological theories in non-western, non-urban environment; alternative explanations for the spatial patterning of social phenomena; selected methodological problems. 3 units. PROFESSOR THOMPSON, ASSOCIATE PROFESSOR SMITH, AND ASSISTANT PROFESSOR WINSBOROUGH

351, 352. SEMINAR IN SOCIAL ORGANIZATION.—Examination of such problems as the bases of social cohesion and continuity, the sources and effectiveness of social control mechanisms, the problem of social change in structural-functional theory. 3 units each semester.

PROFESSORS MCKINNEY AND THOMPSON AND ASSOCIATE PROFESSOR MADDOX

373, 374. SOCIAL PSYCHOLOGICAL ISSUES IN SOCIOLOGY.—Detailed exploration of selected problem areas such as the theory and measurement of social attitudes, role discontinuity and personality disorders, applications of reference group theory, the socialization process. Students must have permission of the instructor or have had at least 6 units in some of the following courses: 142, 171, 172, 275, 341b. 3 units each semester.

PROFESSOR BACK AND ASSOCIATE PROFESSOR KERCKHOFF

385, 386. SEMINAR IN SOCIOLOGICAL THEORY.—Detailed analysis of methodological and substantive problems in utilizing comprehensive, middle-range, and discrete theories in varied sociological areas. Major emphasis on the use of theory in empirical research. Open to students who have had 281 or its equivalent. 3 units each semester. PROFESSORS MCKINNEY AND ASSOCIATE PROFESSOR PREISS

392. INDIVIDUAL RESEARCH IN SOCIOLOGY.—Students will conduct on an individual basis research designed to evaluate a sociological hypothesis of their choice. The process must be completed by preparation of a report on this research in adequate professional style. Prerequisite: Sociology 295 or permission of the instructor. 3 units each semester.

PROFESSORS BACK, ASSOCIATE PROFESSORS SMITH AND KERCKHOFF

397, 398. SEMINAR IN SPECIAL RESEARCH PROBLEMS.—Treatment in depth of either selected methodological issues and/or methods. Examples of possible topics include scaling, methods of machine data processing, validation and induction, quantification, interviewing, measurement, sampling plans, development of research designs from statistical models, methodological research, experimental techniques, the relation of theory to research, and the role of statistical methods in sociology. Open to students by permission of the instructor. 3 units each semester.* PROFESSOR BACK, ASSOCIATE PROFESSORS KERCKHOFF AND SMITH

410. SEMINAR IN THE GOVERNMENT, HISTORY, AND SOCIAL STRUCTURE OF INDIA AND PAKISTAN. 3 units.*

PROFESSOR BRAIBANTI, VISITING PROFESSOR ISLAM, AND ASSOCIATE PROFESSOR ROWE

## ZOOLOGY

PROFESSOR HORN, CHAIRMAN, 227 BIOLOGICAL SCIENCES BUILDING; ASSOCIATE PROFESSOR ROBERTS, ACTING DIRECTOR OF GRADUATE STUDIES, 044 BIOLOGICAL SCIENCES BUILDING; PROFESSORS BOOKHOUT, GRAY, GREGG, MENZIES, SCHMIDT-NIELSEN, WILBUR; ASSOCIATE PROFESSORS BAILEY, FLUKE, HUNTER, KLOPFER, LIVINGSTONE, VERNBERG, WARD; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN; ASSISTANT PROFESSOR COSTLOW

To undertake study toward an advanced degree in zoology, a student should have completed an undergraduate major in zoology or its equivalent. This normally

amounts to 24 or more hours for course work distributed among various fields of zoology. The department recognizes the trend in modern biology towards interdisciplinary research and part of the zoology requirements may be replaced by advanced work in chemistry, mathematics, physics, etc.

Required work for the A.M. degree ordinarily includes 12 units of advanced course work in zoology, 6 units of course work in a minor department, and an additional 6 units of advanced work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and a dissertation based on original work. Minor work is available in many fields, including anatomy, biochemistry, botany, chemistry, physics, physiology and psychology.

FOR SENIORS AND GRADUATES

201. ANIMAL BEHAVIOR.—A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: Physiology, Genetics and Evolution, or consent of instructor. 3 units; 4 units with laboratory. (Not 1964-65) ASSOCIATE PROFESSOR KLOPFER

203. ECOLOGY.—Relation of animals to environment. Lectures, reading, reports, conferences; laboratory and field work. 4 units. PROFESSOR GRAY

210. EXPERIMENTAL GENETICS.—The relationship of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Laboratory. Prerequisites; Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent) or consent of instructor. 4 units. (1964-65) ASSOCIATE PROFESSOR WARD

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 4 units. (*Given at Beaufort.*) PROFESSOR MENZIES

216. LIMNOLOGY.—A study of lakes, ponds, and streams, including their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities living in them. Lectures, field trips, laboratory work. Prerequisites: one year each of biology, chemistry, and physics and Mathematics 21; or permission of instructor. 4 units. (1964-65) ASSOCIATE PROFESSOR LIVINGSTONE

222. ENTOMOLOGY.—Anatomy, physiology, embryology, and classification of insects. Prerequisite: one year of zoology. 4 units.* PROFESSOR GRAY

224. VERTEBRATE ZOOLOGY.—A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 units. (Not 1964-65) ASSOCIATE PROFESSOR BAILEY

228. EXPERIMENTAL EMBRYOLOGY.—Lectures, readings, reports, and laboratory work. 4 units. (Not 1964-65) PROFESSOR GREGG

238. SYSTEMATIC ZOOLOGY.—The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisite: Zoology 1, 2. 4 units. (1964-65) ASSOCIATE PROFESSOR BAILEY

243. CYTOLOGY.—The structure of the cell. Lectures, readings, reports, and laboratory work. Prerequisites: Zoology 53, 92, 156, or equivalent and consent of instructor. (This is the same course as Botany 203.) 4 units. ASSOCIATE PROFESSOR ROBERTS

245. RADIATION BIOLOGY.—Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: college physics and mathematics, organic chemistry. 3 units, or 4 units with laboratory. (Not 1964-65) ASSOCIATE PROFESSOR FLUKE

246. MOLECULAR BIOLOGY.—The nature, functional relationships and replication of biological structure of the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 units, or 4 with instructor's advanced approval of laboratory work. (1964-65)

ASSOCIATE PROFESSOR FLUKE

247. BIOLOGICAL NUCLEONICS.—Laboratory instruction in biological uses of radioactive tracers, primarily with microörganisms, in counting instruments and measurements, and in legal requirements. Prerequisites: by consent of the instructor and normally two years of biology and one year of college chemistry. 2 units. (Not 1964-65)

ASSOCIATE PROFESSOR FLUKE

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla from various habitats are studied. Prerequisite: A course in physiology. 6 units. (*Given at Beaufort*)

ASSOCIATE PROFESSOR VERNBERG

252. COMPARATIVE PHYSIOLOGY.—The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 units.

PROFESSOR SCHMIDT-NIELSEN

253. ADVANCED VERTEBRATE MORPHOLOGY.—Descriptive and experimental studies in comparative vertebrate morphogenesis. Lectures, readings, reports, and laboratory. Prerequisites: Zoology 53, 92. 4 units.* PROFESSOR HORN

271. CELLULAR PHYSIOLOGY.—The physiological processes of living matter approached through studies of cells. Prerequisites: two years of biology and at least one year of chemistry. 4 units. PROFESSOR WILBUR; ASSOCIATE RESEARCH PROFESSOR B. SCHMIDT-NIELSEN

274. INVERTEBRATE ZOOLOGY.—A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Zoology 1 and 2. 4 units.* (See also Marine Laboratory)

PROFESSOR BOOKHOUT

276. PROTOZOOLOGY.—The morphology, physiology, taxonomy, and culture of protozoa. Prerequisites: Zoology 1 and 2. 4 units.* PROFESSOR BOOKHOUT

278. INVERTEBRATE EMBRYOLOGY.—Lectures, readings, and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 units.* PROFESSOR BOOKHOUT

FOR GRADUATES

351, 352. DEPARTMENTAL SEMINAR.—A weekly meeting of graduate students and faculty to hear reports and to discuss biological facts, theories, and problems. One hour a week throughout the year. 1 unit credit by arrangement.

ALL MEMBERS OF THE GRADUATE STAFF

353, 354. RESEARCH.—Students who have had proper training may carry on research under direction of members of the staff in the following fields: (A) Embryology, (B) Physiology, (C) Cytology, Histology, (D) Invertebrate Zoology, (E) Ecology, (F) Morphology, (G) Parasitology, (H) Vertebrate Zoology, (I) Limnology, (J) Entomology, (K) Genetics, (L) Biophysics, (M) Animal Behavior, (N) Systematics, (O) Oceanography. Hours and credits to be arranged.

ALL MEMBERS OF THE GRADUATE STAFF

355, 356. SEMINAR.—One or more seminar courses in particular fields are given each semester by various members of the staff. These will be in the fields indicated under courses 353-354 above. 2 units.

MARINE LABORATORY.—The following courses will be given at Duke University Marine Laboratory, Beaufort, N C., during the summer of 1964: 203, Marine Ecology; 214, Biological Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology.

## MEDICAL SCHOOL

The facilities of the several Departments of the Medical School listed below and alphabetically as departments are available to qualified graduate students, already admitted to the Graduate School, for independent or supervised research and investigation, whether or not they are working toward advanced degrees.

Graduate students wishing to pursue a major or minor on any of the following departments, or to enroll in any of the courses listed elsewhere, should consult or write the appropriate Director of Graduate Studies.

Because of the special schedules maintained in the Medical School, graduate students should write the Directors to ascertain the precise dates when courses are offered.

ANATOMY (see p. 59)
BIOCHEMISTRY AND NUTRITION (see p. 61)
MICROBIOLOGY AND IMMUNOLOGY (including MYCOLOGY, PARASITOLOGY, and HEMATOLOGY (see p. 91)
PHYSIOLOGY and PHARMACOLOGY (see p. 97)

# THE SCHOOL OF LAW

Fall semester begins September 17, 1964

Spring semester begins January 27, 1965

# The School: Its Purpose and Methods

THE OFFICIAL NAME of the School is the Duke University School of Law, but it will be referred to in these pages as the Duke Law School or the Law School.

The Duke Law School stems historically from the School of Law of Trinity College, with its history of legal instruction running back to the middle of the past century, antedating the Civil War. When, in the 1920's, Trinity College became Duke University, the Law School was completely reorganized. This reorganization culminated with the housing of the Law School on the new West Campus in 1930, when the character of the Duke Law School can be said to have been reshaped.

The curriculum of the Law School provides thorough preparation for the practice of law in any state, and its graduates have been admitted to the bar throughout the nation. Opportunities for specialization in particular branches of the law are afforded.

In carrying out the trust imposed by the indenture establishing the Duke Endowment, the Law School seeks to have the student acquire knowledge and comprehension not only of legal doctrine, but also of the judicial process and of the social, economic, and political problems with which law and lawyers must deal. The method of instruction employed compels analysis of judicial opinions and inquiry into the nonlegal as well as the legal considerations which underlie them. In appropriate courses, special consideration is given to the work of the legislative and administrative agencies of government. In recognition of the increasing importance of the role of the lawyer in representing private interests before government agencies and in government service, a broad program is offered in the public law field. Scope for creative student work is provided by seminar courses and supervised individual study and research.

Practical training is not left for the first years of practice. A carefully integrated series of courses is designed to give students actual experience in the work of lawyers. Legal research, writing courses, moot court work and practical study of steps in law suits in the first and second years are followed in the third year by seminar courses emphasizing trial techniques, legal planning and drafting and interdisciplinary approaches. A student bar association affords a means whereby the student may gain acquaintance with the professional organizations through which a lawyer may and should contribute to the well-being of his profession and society.

# Admission, Registration, and Fees

## *Admission*

### DIRECTIONS TO APPLICANTS FOR ADMISSION

APPLICATION must be made on the prescribed Law School application blank which will be sent upon request. A fee of $10.00 is charged for filing an application. No applicant will be accepted until all required documents are on file. These documents are: (1) the application itself, to which a recently made personal photograph must be attached; (2) a transcript of college record (see next paragraph); (3) a report of the applicant's score on the Law School Admission Test, described below; (4) letters from an official of the college attended and from three or more responsible persons who are acquainted with the applicant's character and general qualifications. *These letters will be requested by the Law School,* and the applicant need only furnish the names and addresses of persons from whom the desired information can be obtained.

Most of our applicants apply at a time when they are still in college, either in the fall or winter of their current college year. We do not ordinarily wait for the completion of the current year's college work before admitting an applicant; normally we take acceptance action on the basis of a transcript showing college work through the junior year, although we may at times ask for a transcript showing also one semester or term of the senior year. Such acceptance is tentative only and is subject to our final action taken in the light of the further supplemental transcript showing all the college work required for admission to the Law School. (However, it is very rare for an accepted applicant to be later rejected on the basis of his completed transcript.) A good time for a student in college to apply, particularly if he has an outstanding record and wants to make his law school plans early, is in the fall of his last year.

Admitted applicants are required to deposit the sum of $50.00 with the Office of the Bursar. This deposit is non-refundable, but will be credited to the account of the matriculated student.

The Law School Admission Test, referred to above, is administered by the Educational Testing Service. It is given four times a year at examination centers conveniently located throughout the United States. No special preparation for the test is suggested, since it is designed to measure aptitudes, abilities and general background rather than knowledge of subject matter. The applicant's score on the test

will be considered along with other data in passing upon his admission to the Law School. Application forms and information concerning the test should be procured by writing directly to the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

## TIMES OF ADMISSION

Beginning students may enter only at the opening of the fall semester in any year. Students who have completed the first year of law study at this or any other law school approved by the Association of American Law Schools may enter at the beginning of any semester.

## REQUIREMENTS FOR ADMISSION

An application for admission to Duke Law School as a candidate for the degree of Bachelor of Laws may be submitted by any person who is a graduate of a college of approved standing. Applications may also be submitted by a candidate who has completed in a college of approved standing work equivalent in number of units to three-fourths of that required for graduation and whose college work is of outstanding superior quality and in its entirety shows an average grade far above that required for graduation, the requirement in each case being determined by the regulations of the college where the work was taken.

## COMBINED COURSE

A number of colleges, upon application by their students, have permitted those who have completed three years of undergraduate work to enter the Duke Law School and upon the satisfactory completion of the first year of law school work to receive their Bachelor of Arts degree from such colleges. It is suggested that students desiring to enter Duke Law School under such a program make inquiry of their proper college authorities regarding this point if they meet the applicable requirements of the preceding paragraph.

A student from an undergraduate college of Duke University who has completed therein three years of study may apply to that college to enroll in a combined course wherein his first year of law study may be accepted toward the Bachelor of Arts degree. Upon the completion of four additional semesters of law study, he will receive the Bachelor of Laws degree.

Students considering entrance before obtaining the Bachelor's degree should consult the rules of the Board of Bar Examiners in the state where they plan to practice law, for regulations applicable to this program.

## ADMISSION TO ADVANCED STANDING

Any person who has complied with the requirements for admission set forth in this announcement prior to the commencement of his law study, who presents evidence of the satisfactory completion of at least

one year of study at any law school which is a member of the Association of American Law Schools, and who is eligible for readmission to the law school from which he proposes to transfer, may be admitted to advanced standing, subject to such rules as would be applicable to students in this School having a comparable scholastic record. Provisional credit for courses so completed will be given, final credit being conditioned on the completion of at least one full year of law study in this School with an average at least five points above the passing grade. Adjustment of credit for work done in such other law schools may be made by the Dean or by vote of the Faculty.

### CANDIDATES FOR GRADUATE DEGREES

Applications for admission to graduate study should be addressed to the Dean of the Law School and should include transcripts of records of legal and prelegal work. For the requirements for the graduate degrees, see pages 21-24.

## *Registration*

All students are required to register on the dates prescribed in the Law School Calendar, at which time class schedules and course cards must be filled out and approved. A student's registration for any semester is not complete until he has settled all indebtedness with the Office of the Bursar. Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a $5.00 penalty for late registration.

### REGISTRATION FOR BAR EXAMINATION

Many states now require that a student, prior to or shortly after beginning of the study of law, register with the board of bar examiners of the state if he intends to practice therein. Each student should ascertain by writing to the secretary of the board of bar examiners of the state in which he plans to practice, or by other channels of information, whether that state makes this requirement.

### CONDUCT OF STUDENTS

All students are admitted subject to the rules of the University and of the Law School, and continuance in the School is conditioned upon the observance of such rules.

The University expects of its students loyal and hearty co-operation in developing and maintaining high standards of conduct and scholarship. The University, therefore, reserves the right, and matriculation is a concession by the student of this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University.

## *Fees and Expenses*

Tuition is due and payable not later than the day of registration for a particular semester. For the academic year 1964-1965, the tuition is $600.00 a semester. After the final day of registration no refund of the tuition will be made except for involuntary withdrawal to enter the armed forces.

Law students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of $15.00 per year plus any taxes that may be imposed. (This fee is payable in the fall semester.) They also may use the facilities of the Duke Golf Course upon payment of student green fees.

It is estimated that the expenses of a thrifty unmarried student at Duke Law School, aside from tuition, can be kept around $1,250.00 per academic year.

Additional fees and expenses are discussed under the headings Living Accommodations, Dining Service, and Motor Vehicles.

## *Scholarships, Loans, and Employment*

Scholarships are available, varying in amount. Except for a few scholarships that are based purely on merit, scholarships are awarded only to needy applicants with markedly superior college records and comparable Law School Admission Test scores. A scholarship may cover all or part of the tuition charge. The more usual form of financial aid is a combination of scholarship and loan. Optimum administration of scholarship funds may compel the School to give preference, as between applicants with substantially equal credentials, to those not seeking scholarship aid. Scholarship grants will be continued to second- and third-year students maintaining a high standard of work.

To the extent of the funds allocated to Duke University from its participation in the student loan program established under the National Defense Education Act of 1958, loans up to $1,000 per year (so limited as of the present writing) are available to Duke students. Interest on these loans begins to accrue at three per cent one year after the student leaves the School, and repayment normally begins two years after the student leaves the School, with complete repayment scheduled over a ten-year period.

Loans from funds held in trust by the University are also available to qualified law students. Interest on these loans, which mature after the student has left the School, accrues from the date of each note at the rate of one per cent until the student has left the School and for five years thereafter at three per cent per year, with repayment in

installments over the five-year period. Loans from these funds are available up to $1,200 per year, less the amount of any loan made under the paragraph above.

Approval of loan application is based on the financial need, scholastic attainment, and personal integrity of the applicant. Unmarried students with automobiles, who plan to live on campus, must establish a bona fide need for the automobile before a loan application will be approved. It is hoped that for 1964-65 and 1965-66 sufficient loan funds from the sources mentioned in the two paragraphs above will be available for all Duke students in serious financial need, even for those with scholarships.

In addition to the loans above mentioned, the School participates in the United Student Aid Fund program. This program provides guaranteed commercial bank loans (on usual bank terms) to needy law students, up to $1,000 per year. These loans are readily available.

A special fund is also available for law students for small loans to tide over temporary financial emergencies arising during the course of the year.

Although it is not advisable for a law student to undertake any substantial amount of outside work, arrangements have been made to provide part-time employment for capable law students who otherwise would be unable to meet the expense of studying law at Duke.

A number of positions as assistants in the Law Library and as research assistants are open to students, particularly in their second or third year, with some preference being given to those who do not receive other aids from the University.

## *Living Accommodations*

The Men's Graduate Center is available to men enrolled in the Law School. The rooms are equipped for two persons and the rental charge for a double room is $500.00 for the academic year or $250.00 for each occupant ($125.00 per semester for each occupant).

Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School. The rental charge for a single room is $325.00 for the academic year or $162.50 for each semester. The rental charge for a double room is $550.00 for the academic year or $275.00 for each occupant ($137.50 per semester for each occupant).

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the rental charges per month are $70.00 for the efficiency, $80.00 for the one-bedroom, and $90.00 for the two-bedroom. Heat, electricity except for window fans and air conditioners, hot and cold water, garbage and

trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Further information will be sent upon request. Address

THE DEAN OF THE SCHOOL OF LAW
DUKE UNIVERSITY
Durham, North Carolina

# Bachelor of Laws Degree

UPON favorable recommendation of the Faculty, the degree of Bachelor of Laws will be conferred on students who shall have successfully completed six semesters' study of law, the last two semesters of work immediately preceding the granting of such degree having been completed in this School.

A student shall be deemed to have completed successfully six semesters' study of law if during this period he has

(1) secured a passing grade in courses aggregating 84 semester hours;

(2) secured in every required course a grade not requiring repetition thereof; and

(3) secured a weighted average at least five points above passing, whether computed by including or by excluding the grades in the first-year courses.

Students who have spent only their last two semesters of study in residence in this School must have received a weighted average at least five points above passing for that year.

## MINIMUM AND MAXIMUM STUDENT LOADS

No regular student is permitted to take less than twelve course hours per semester.

No first-year student is permitted to take courses in excess of the first-year program. Second- and third-year students are not permitted to take for credit more than sixteen course hours per semester, nor to audit and take for credit more than seventeen course hours per semester.

In exceptional cases, students may petition the Faculty for permission to take more or less than the prescribed maximum or minimum loads, but no student shall receive full residence credit if he takes fewer than ten hours per semester for credit.

## ATTENDANCE

Regular class attendance is required. The right to take the examinations, as well as the privilege of continuing one's membership in the School at any time, is conditioned upon regular attendance at the exercises of the School.

## STANDARDS OF SCHOLARSHIP

GRADES.—The final grades in each course are given in numerical terms which are equivalent to letter grades according to the following scale: 80 to 100, A; 70-79, B; 55-69, C; 50-54, D; 0-49, F.

A grade of 50 is necessary for passing a course. Grading policy (including repetition of courses failed) is prescribed by the Law School Rules.

ELIGIBILITY TO CONTINUE LAW STUDY.—Any student who at the end of his first year or at the end of any subsequent semester has an average grade lower than 50 on all the work then taken is ineligible to continue his work in the School. Any other student (1) whose average final grade at the end of his first semester is below 50, or (2) whose average grade at the end of any subsequent semester on all the work then taken is below 55, (3) who in any single semester or in any single year receives failure grades in courses totaling eight or more semester hours, may at any time be declared by the Dean ineligible to continue.

NOTIFICATION OF UNSATISFACTORY SCHOLASTIC STANDING.—Every student subject to the provisions of the second sentence of the paragraph above, who has not been declared ineligible to continue his work in the School will be given a formal, written notice by the Dean's Office. This notice will set forth his average grade or grades and inform him (1) that he will be subject for the ensuing year to the special supervision of the Dean, who may order his dismissal from the School in the event of his failure to maintain a satisfactory scholastic standard, and (2) that he will be ineligible to receive a degree unless his work meets the scholastic requirements for graduation, which will be set forth in full in such notice.

Every other student whose average final grade at the end of any semester on the work of that semester, or on all work then taken, does not exceed the minimum average grade required for graduation by more than two points will be given a notice similar to that provided for above.

# Graduate Work in Law

## *Objective of the Graduate Study Program*

THE graduate program is framed with a view to the encouragement and recognition of legal scholarship. It is designed for the qualified candidate who aspires to a teaching career, or who wishes to become proficient in a special field of the law, to do legal research, to prepare himself for a public-law practice in or out of government, or to pursue studies in subjects he has not previously explored. This program is especially suitable for law teachers and for those who wish to become either law teachers or specialists in the law and who wish to carry on advanced study and original research under faculty supervision, and for foreign law students, teachers and lawyers who desire to extend their knowledge of the laws of the United States and to engage in comparative legal research.

Three graduate degrees are granted: the degree of Master of Laws (LL.M), the degree of Master of Comparative Law (M.C.L.), and the degree of Doctor of Juridical Science (S.J.D.).

## *Master of Laws*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF MASTER OF LAWS

Any person who has received the first degree in law from a law school which is a member of the Association of American Law Schools, or from a university in the United Kingdom of Great Britain and Northern Ireland, or in Australia, Canada, Eire or New Zealand, may be admitted as a candidate for the degree of Master of Laws, provided he satisfies the Committee on Graduate Study that his objective in desiring to do graduate work in law is consistent with the purposes for which the program is offered, and provided he demonstrates to the Committee, on the basis of his record, his capacity to take and profit by graduate work in law. Normally the applicant will be required to show a level of scholarship appreciably higher than that required for the first degree in law at the institution from which he received that degree. Those applicants who aspire to a teaching career are expected to have had, and are expected to maintain throughout their graduate studies, an exceptionally high academic record.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF LAWS

The degree of Master of Laws is reserved for students who, having demonstrated their capacity for graduate work in law, maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

The candidate for this degree is required to complete a course of study comprising not less than twenty nor more than twenty-six semester hours, or approved research equivalent thereto. Two full semesters are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses or seminars selected from those offered in Jurisprudence, in Legal History, and in the International or Comparative Law area. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit of not more than two hours a semester may be given for approved special supervised-research projects. In addition to completing twenty semester hours of courses or seminars the candidate must prepare and submit an essay, representing substantial research on a legal subject. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. The candidate will find it helpful to have formulated a project of research, or alternative projects, before his admission to graduate study or, at any rate, before pursuing his graduate study in residence. In appropriate cases, the candidate will be permitted, and may be encouraged, to take related work in other departments of the University.

## *Master of Comparative Law*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF MASTER OF COMPARATIVE LAW

Any person (1) who has received the degree of *doctor iuris* or its equivalent from a foreign university, or (2) who, having completed such academic training as is required in his country for the practice of law, has already demonstrated his special qualifications by publications in learned journals or otherwise, and who has the knowledge of and facility in the English language needed to achieve distinction in competitive study at an American university may be admitted as a candidate for the degree of Master of Comparative Law (M.C.L.). The applicant must satisfy the Committee on Graduate Study that his objective in doing graduate work in comparative law is consistent with the purposes for which the program is offered, and he must further demonstrate to the Committee, on the basis of a scholastic record comparable to at least a B average at an American law school of high standing, and by his previous publications, if any, his capacity to profit by graduate work in law. Normally, admission to candidacy for this

degree is limited to applicants who intend to study one or more specific fields of American law with a view to utilizing such knowledge upon their return to their respective countries, and who have already done some preparatory work in this direction.

Any person eligible to be admitted as a candidate for the degree of Master of Laws may, upon recommendation of the Committee on Graduate Study, be admitted to candidacy for the degree of Master of Comparative Law.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF COMPARATIVE LAW

The degree of Master of Comparative Law is awarded only to students who maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

The candidate for this degree is required to complete a course of study comprising not less than twenty semester-hours. At least two semesters' residence are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses from those offered in the World Law and Comparative Law area, and either Jurisprudence or Legal History. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit for not more than two hours a semester may be given for approved, supervised-research projects. The candidate is also required to submit an essay representing substantial research on a subject of comparative or international law, written in the English language. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. In appropriate cases, the candidate may be permitted and may be encouraged, to take related work in other departments of the University.

## *Doctor of Juridical Science*

### ADMISSION TO CANDIDACY FOR THE DEGREE OF DOCTOR OF JURIDICAL SCIENCE

A person holding the degree of Master of Laws or Master of Comparative Law (or Jurisprudence) from this or any other law school which is a member of the Association of American Law Schools may, on recommendation of the Committee on Graduate Study and favorable vote of the Faculty, be admitted to candidacy for the degree of Doctor of Juridical Science (S.J.D.), provided he completed the work for the Master's degree with distinction.

## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF JURIDICAL SCIENCE

Upon recommendation of the Faculty, the degree of Doctor of Juridical Science will be conferred on students admitted to candidacy for that degree who complete and submit a monograph or series of essays suitable for publication and deemed by the Faculty to be of distinguished character and who pass an oral examination before a special committee appointed for that examination. At least one academic year and, in the absence of an extension granted by the Faculty, not more than three years must elapse between the award of the Master's degree and the award of Doctor of Juridical Science. Students who have received the Master's degree from another law school must spend at least two full semesters engaged in research at this School, and in addition may be required to complete a course of study prescribed by the Committee on Graduate Study. The monograph or series of essays required may be based upon, or be an extension of, the essay required for the Master's degree, provided substantial additional research is represented.

# Facilities and Activities

## *The Law School Building and Its Facilities*

THE NEW Law School Building was completed and occupied in September, 1962. Located just off the Gothic core of the West (main) Campus, the building is of modified Georgian architecture with contemporary overtones. It reflects a notable characteristic of the School: a high ratio of facilities to students admitted. Despite long-range plans to keep the student body modest in size, the new Law Building in its general spaciousness, number of classrooms and seminar rooms, library reading-room seatings, library stack spaces, student carrels, student lockers, student lounge rooms, faculty offices, quarters for legal publications, special quarters for institutional studies and courtroom is of proportions ordinarily associated with a far larger student body.

Additional information concerning the Law School and its facilities is contained in the illustrated brochure *Studying Law at Duke.*

### THE LAW LIBRARY

The Law Library is one of the large law school collections in the country. It consists of American and English statutory and case law; collections of international, comparative and foreign law materials; treatises, digests, encyclopedias; the various selected case series; a comprehensive collection of legal periodicals; and publications in the fields of history, economics, government, and other social sciences, supplemental to the strictly legal materials. The Library receives every current legal periodical of general interest printed in the English language and complete up-to-date legislation of the United States and of every state and territory of the Nation.

There are many thousands of additional volumes of a legal nature in the main University Library Building, as well as the general collection of over a million volumes, to all of which the law students and Faculty have convenient access.

The Law Library is administered by a professionally trained staff and is open to the public daily, as well as in the evenings when the Law School is in session.

### WORLD RULE OF LAW CENTER

In the fall of 1958, the Duke Law School established its World Rule of Law Center, with Professor Arthur Larson as its Director.

The purpose of the Center is to undertake both long-range and current studies and publications bearing on the settlement of international disputes and the achievement of peaceful change under law. Typical projects include "Sovereignty within the Law"; "Propaganda within the Law"; a definitive analysis of the World Court; and a series of studies of United Nations peace-keeping devices. A staff of about ten international lawyers is maintained, together with an undergraduate law student research assistant staff which generally numbers about twelve. The regular staff includes specialists in all the world's major legal systems. Opportunities for course work at the Law School include not only the regular courses in International Law, Comparative Law, and the Law of International Economic Relations, but a unique Seminar in World Law for students particularly interested in this approach to the problem of world order.

Duke University students are also encouraged to combine graduate work with activities of the Center, opportunities for which are made available as far as practicable.

## *Publications*

### LAW AND CONTEMPORARY PROBLEMS

The School of Law publishes a quarterly, *Law and Contemporary Problems,* edited by Professor Hans W. Baade. This periodical, now in its twenty-ninth volume, presents in each issue a symposium on a problem of current importance, in which the inter-related social and economic, as well as legal, factors are discussed by writers of competence in these respective fields.

The circulation of *Law and Contemporary Problems* extends not only to members of the legal profession and law libraries throughout the country, but also to industrial and financial concerns, governmental agencies, and public and general university libraries. Individual issues are not infrequently used as materials for study in University courses.

### JOURNAL OF LEGAL EDUCATION

The *Journal of Legal Education,* a quarterly, is also edited at the School of Law, under the direction of Professor John D. Johnston, Jr. The publication serves as the organ for the Association of American Law Schools, providing a clearing house for ideas and professional studies in the constantly expanding field of legal education. The editorial policy of the *Journal of Legal Education* is determined by an editorial board named by the Association, assisted by an advisory committee consisting of prominent legal educators.

### DUKE LAW JOURNAL

American legal education boasts at least one unique institution. Only in America, and only in law, are the scholarly professional journals edited and largely written by students. The *Duke Law Journal* carries forward this proud tradition, which dates from the latter part of the nineteenth century. Articles written by teachers, lawyers, judges and other scholars are critically evaluated and edited by the board of student editors. Notes and comments concerning recent judicial, legislative and other developments are written by the students themselves, and edited by their fellow students. Members of the Faculty are of course available for advice and consultation. The quarterly issues are widely circulated, and become an integral part of the storehouse of informal and critical materials to which the profession in all its branches must resort. The student-edited law journal has had a profound influence on the growth and development of the law.

Membership in the *Journal* is the highest honor that can be attained by the student, being reserved for those who not only excel in their courses but also demonstrate capacity to do creative research and writing. Moreover, in the well-nigh universal judgment of the profession, the experience gained in this work provides the best training that the Law School has to offer. It should be the aim of every qualified student to take advantage of this opportunity.

### CORPORATE PRACTICE COMMENTATOR

The *Corporate Practice Commentator,* a quarterly periodical devoted to significant developments and new thinking in the field of corporation law and practice, is edited by Professor F. Hodge O'Neal. Although the *Commentator* is published by a commercial concern, it is assembled and manuscript is prepared in the School of Law under the direction of Professor O'Neal. The *Commentator* gives attention to matters of interest and importance to counselors and managers of corporate and other business enterprises. Primary emphasis is placed on corporation law and practice in the narrow sense, but a considerable amount of space is devoted to antitrust questions, labor matters, patents and copyrights, executives' compensation, fair trade legislation, and other matters arising out of business activities.

## *Organizations, Honors and Activities*

### THE DUKE BAR ASSOCIATION

The Duke Bar Association is the student governing organization of the Law School, and is organized along the lines of the American Bar Association. Its purpose is to introduce the student to the problems

considered by the Bar in professional organizations and to develop professional consciousness and responsibility.

The Duke Bar Association sponsors professional and social activities throughout the year. Dues are $15.00 per annum, payable in September.

## ORDER OF THE COIF

A chapter of the Order of the Coif, national legal scholarship society, has been established at Duke University School of Law. Its purpose is "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." Election is restricted to the ten per cent of the graduating class who have attained the highest rank in their law school work.

## MOOT COURT BOARD

A program of student Moot Court arguments is conducted under the supervision of the Moot Court Board as a part of the course in Research and Writing in which all first-year students are required to participate. In addition, a team of students is selected each year to represent the Law School in the National Moot Court competition.

## INTERNATIONAL LAW SOCIETY

Recognizing the importance of the role of law in international affairs, the Duke International Law Society provides a program for examining the application of international law to world problems. Through a series of lecture-discussions in the fall called "A Short Course in International Law" and by featuring distinguished speakers in the field throughout the year, the Society provides its members the opportunity to make contact with the men and ideas that are shaping the development of international law.

Other activities include participation in the annual Philip C. Jessup International Law Moot Court competition, attendance at conferences sponsored by the Association of Student International Law Societies, and entry into various writing contests.

Membership is open to all law students at $5.00 per annum.

# Program of Instruction

## *First Year* (Required)

| | Semester Hours Fall | Spring |
|---|---|---|
| Business Associations I | | 3 |
| Chattel Transactions | 2 | |
| Civil Procedure | 3 | 3 |
| Contracts | 3 | 3 |
| Criminal Law & Procedure | 2 | 2 |
| Property I | 2 | 2 |
| Research & Writing | 1 | 1 |
| Torts | 3 | 2 |
| | 16 | 16 |

## *Second and Third Year*

In the absence of special authorization by the Dean, each student is required to take in each semester courses aggregating not less than 12 and not more than 16 hours.

The program in the second and third years is entirely elective. In planning his elective program, the student must bear in mind that certain courses are pre-requisites to other advanced courses:

Business Associations II is pre-requisite to the Seminars in Securities Regulation and Corporate Planning and Drafting.

Conflict of Laws is a pre-requisite to the Seminar in Conflict of Laws.

Evidence is pre-requisite to Trial Practice.

Federal Taxation I is a pre-requisite to Federal Taxation II and Federal Taxation III.

Federal Taxation I, Federal Taxation III, and Property II are pre-requisites to the Seminar in Tax and Estate Planning.

Labor Relations is pre-requisite to the Seminar in Labor Law.

Trade Regulation is pre-requisite to the Seminar in Public Regulation of Business.

Constitutional Law is pre-requisite to the Seminar in Civil Liberties and Rights.

The elective courses and seminars offered in the second and third years are:

| TITLE | SEMESTER HOURS Fall | Spring |
|---|---|---|
| Administrative Law | 3 | |
| Business Associations II | 2 | 2 |
| Conflict of Laws | 3 | |
| Debtors' Estates | 3 | |
| Equitable Remedies | 2 | |
| Evidence | 4 | |
| Family Law (not offered 1964-5) | 2 | |
| Federal Taxation III | 3 | |
| Insurance | 2 | |
| International Law | 3 | |
| Labor Relations | 3 | |
| Legal Accounting | 2 | |
| Legal Process | 3 | |
| Negotiable Instruments | 3 | |
| North Carolina Practice | 2 | |
| Patent Law (not offered 1964-5) | 2 | |
| Property II | 4 | |
| Securities Regulation | 3 | |
| Seminar in Criminal Law | 2 | |
| Seminar in Military Law | 2 | |
| Seminar in Urban Renewal | 1 | |
| Seminar in World Law | 3 | |
| Trade Regulation | 3 | |
| Admiralty | | 3 |
| Comparative Law | | 3 |
| Constitutional Law | | 4 |
| Federal Jurisdiction | | 2 |
| Federal Taxation I | | 3 |
| Federal Taxation II | | 3 |
| International Economic Relations (not offered 1964-5) | | 3 |
| Jurisprudence (not offered 1964-5) | | 3 |
| Legal History (not offered 1964-5) | | 2 |
| Legal Profession | | 1 |
| North Carolina Statutes | | 2 |
| Real Estate Transactions | | 3 |
| Sales | | 3 |
| Security | | 3 |
| Seminar in Civil Liberties and Civil Rights | | 2 |
| Seminar in Conflict of Laws | | 2 |
| Seminar in Corporate Planning and Drafting | | 2 |
| Seminar in Labor Law | | 2 |
| Seminar in Problems in Conflict of Laws | | 2 |
| Seminar in Regulated Industries | | 2 |
| Seminar in State and Local Government | | 2 |
| Seminar in Tax and Estate Planning (not offered 1964-5) | | 2 |
| Seminar in Workmen's Compensation | | 2 |
| Social Legislation | | 2 |
| Trial Practice | | 2 |
| Trusts | | 3 |

Individual research by students for credit, not exceeding three semester hours per year, will be permitted, subject to the approval and under the supervision of a faculty member.

# Description of Courses

## *Business Courses*

BUSINESS ASSOCIATIONS I. Legal principles concerning association in business by agency, partnership, other unincorporated forms and corporations. Creation, form and nature of agency, partnership and corporation, corporate existence (de facto corporations, corporate entity and its limitations), powers, duties, liabilities and compensation of agents, partners, officers and directors, risks in conduct of business by representatives (vicarious liability in tort, authority to contract), imputation of notice and knowledge, scope of enterprise (ultra vires), revocation and termination of authority, ratification, undisclosed business associates, stability of the associational relationship. The purpose of this course is to grasp basic principles of Agency and Partnership and introductory related principles of corporation law. (The main basic study of corporation law, however, is in Business Associations II.) Three hours a week second semester. MR. LATTY

BUSINESS ASSOCIATIONS II. Promoters, subscription to and issue of shares, stock structure and corporate capital, dividends, preferred stock, bonds, capital increases and reduction, corporate re-acquisition of own stock, elementary principles of corporate accounting, public issue of securities, stock transfers, fundamental corporate changes (recapitalization, sale, merger and consolidation, dissolution), stockholders' suits, and certain principles concerning management and operation not studied in Business Associations I. Two hours a week each semester. MR. O'NEAL

CONTRACTS. The formation and legal operation of contracts in general, with attention to problems of drafting and counseling as well as of litigation and extrajudicial settlement. Legal and equitable remedies in contract cases, including damages, specific performance, and restitutionary remedies, and important procedural devices incident to such remedies. Three hours a week throughout the year. MR. O'NEAL

SEMINAR IN CORPORATE PLANNING AND DRAFTING. The student is given hypothetical corporate problems (perhaps taken from the practicing lawyer's desk) on a client's proposed course of action; each problem is designed to require the student to grasp the business situation and goals involved, analyze for pertinent legal principles, plan the transaction to avoid legal business (including taxation) pitfalls, plan the requisite steps to consummate the desired transaction, draft the appropriate papers and present his research. Two hours a week second semester. MR. O'NEAL

DEBTORS' ESTATES. Comparative study of methods used for the liquidation of debtors' estates. The nonbankruptcy materials cover individual creditor's rights by attachment, garnishment, execution, creditors' bills and the like; common law composition; and general assignments. The bankruptcy materials cover, in the main, the first seven chapters of the Bankruptcy Act. Three hours a week first semester. MR. SHIMM

INSURANCE. The nature of "insurance"; government supervision and control; types of insurance organization; the legal requirement of insurable interest; interests of others than the named insured; the measure of indemnity; subrogation; the beneficiary's interest in life insurance; the insured event and excepted causes; warranties, representations and concealment; the making of insurance contracts; waiver, estoppel and election. Two hours a week first semester. MR. HAVIGHURST

INTERNATIONAL ECONOMIC RELATIONS. See Public Law Courses, page 35, for decription.

LEGAL ACCOUNTING. An examination and analysis of accounting principles and practices necessary for reasonably effective collaboration with accountants on problems requiring the work of both lawyers and accountants. The course is designed to develop in the student an understanding of how an accountant's work is used by top management in making decisions, by government in making and enforcing regulations, and by investors and lenders in exercising a discriminating choice in the employment of their funds. Two hours a week first semester.
MR. GRAHAM

NEGOTIABLE INSTRUMENTS. Study of the rules of the law merchant and the provisions of the Negotiable Instruments Law and the Uniform Commercial Code relating to the functions and legal incidents of checks, bills of exchange, promissory notes, and similar commercial instruments. Three hours a week first semester. MR. SHIMM

SALES. Study of the rules of the common law and the provisions of the various uniform acts and the Uniform Commercial Code relating to warranties, risks, remedies for breach, financing, and other legal problems arising in the sale of goods. Three hours a week second semester. MR. SHIMM

SEMINAR IN PUBLIC REGULATION OF BUSINESS. See Public Law Courses, page 36, for description.

SEMINAR IN SECURITIES REGULATION. See Public Law Courses, page 36, for description.

TRADE REGULATION. See Public Law Courses, page 37, for description.

## *Property Courses*

CHATTEL TRANSACTIONS. This course uses the field of Personal Property and the traditional title-passing rules of Sales to appraise judicial reasoning and legal concepts. It serves both as a low-level course in judicial methodology and an introduction to commercial law. It deals with possession and title of chattels, the bailment relationship, artisan's lien, transfer of chattels by gift and miscellaneous inter-vivos transactions. It does not go into details of enforcement of buyers' and sellers' rights or sales financing. Two hours a week first semester. MR. LATTY

PROPERTY I. The basic concepts of real property law and conveyancing. Historical background; estates in land, including the fee simple, the fee tail with its statutory substitutes, the life estate, the estate for years and other non-freeholds; concurrent ownership; types of future interests; conveyances before and after the Statutes of Uses; landlord and tenant; the modern deed—kinds, delivery, description, title covenants; covenants and agreements running with the land at law and in equity; easements; recording and title registration. Two hours a week throughout the year. MR. BOLICH

PROPERTY II. The various rules and concepts governing transmission of property from one generation to another, including the materials normally covered in the traditional courses on Wills and Future Interests. Historical background; intestate succession at common law and under modern statutes; limitations upon testamentary power; execution and revocation of wills; contest of wills; lapse, ademption and satisfaction; future interests, comprising reversions, remainders, executory interests, rights of entry, possibilities of reverter, and their incidents; class gifts; powers of appointment; rule against perpetuities and other restrictions on the creation of interests; construction of wills and deeds. Four hours a week first semester. MR. BOLICH

REAL ESTATE TRANSACTIONS. Aspects of real estate practice including land-use development through private devices involving restrictive covenants, easements, conditions and other concepts; public control by zoning and subdivision legislation; public-private developments such as urban renewal; and some special problems, including cooperative apartments and shopping centers. Three hours a week second semester. MR. BOLICH

SECURITY. Mortgage and security interests in real property, and suretyship. Three hours a week second semester. MR. SHIMM

SEMINAR IN TAX AND ESTATE PLANNING. Seminar devoted to problems and techniques of tax and estate planning. Enrollment limited. Two hours a week second semester. (Not offered in 1964-65.)

TRUSTS. The nature, creation and elements of a trust; character and transfer of the beneficiary's interest; charitable trusts; administration of trusts; termination and modification of trusts; liabilities to and of third persons; enforcement of trusts; and constructive and resulting trusts. Three hours a week second semester.
MR. JOHNSTON

## *Public Law Courses*

ADMINISTRATIVE LAW. The formulation of statutory schemes of administrative regulations: the organization of administrative agencies; the determination, promulgation and enforcement of administrative programs; the respective spheres of administrative and judicial responsibility; judicial control over administrative action. Practice and procedure before administrative agencies: informal conferences and negotiations; formal hearings; constitutional limitations. Three hours a week first semester. MR. MUNDHEIM

SEMINAR IN CIVIL LIBERTIES AND CIVIL RIGHTS. Studies in the field of personal liberties (freedom of speech, press, religion, association, etc.) and in the field of civil rights (right to non-discriminatory treatment, right to fairness in procedure, etc.). The seminar will be concerned with issues about which the law is unsettled, and especially with issues raised in cases pending before the Supreme Court of the United States. Two hours a week and second semester. MR. WALLACE

CONSTITUTIONAL LAW. Judicial protection against arbitrary governmental action; the history of the concept of a "higher law"; the constitutional clauses relied upon. Limitations on governmental power with respect of economic matters, civil liberties and criminal and civil procedure. The powers of Congress, express and from the exercise of Congressional powers. The constitutional questions involved implied; limitations on State governmental powers resulting from the existence and in administrative law, conflict of laws, intergovernmental tax immunities, jurisdiction to tax, and state taxation of interstate commerce are covered more fully in other courses. Four hours a week second semester. MR. WALLACE

CRIMINAL LAW AND PROCEDURE. An introductory study of the law of crimes and the administration of criminal justice; analysis of the criminal act and the mental element in crime; consideration of specific offenses as defined by statute and the common law; discussion of typical defenses in relation to specific crimes; study of the elements of Anglo-American criminal procedure. Two hours a week throughout the year. MR. LIVENGOOD

SEMINAR IN CRIMINAL LAW. Current problems in administering criminal justice, including studies of theory and technique in criminal procedure (investigation, prosecution and defense of criminal charges), inquiry into basic policy in the use of criminal sanctions for the promotion of public order, consideration of contemporary developments (legislative, judicial and administrative) in substantive and adjective criminal law, and analysis of specific problem areas such as mental responsibility, sexual deviation, attempts, and vicarious liability. Two hours a week first semester. MR. LIVENGOOD

FEDERAL JURISDICTION. A study of the federal courts with respect to the part played by them in achieving a workable federalism. Special attention will be given to the original jurisdiction of the federal district courts, the relationship of the federal courts to state courts and state law, and the permissible and desirable range of federal judicial power. Two hours a week second semester. MR. PASCHAL

FEDERAL TAXATION I. An introduction to federal taxation with emphasis on the federal income tax. The topics considered include such basic concepts of income taxation as taxable income, deductions, the taxable person, accounting for income and deductions, computation of the tax, and capital gains and losses. Three hours a week and second semester. MR. HAMBRICK

FEDERAL TAXATION II. A continuation of Federal Taxation I. Among the topics considered are the taxation of corporations and corporate distributions, corporate reorganizations and readjustments, the personal holding company surtax and the accumulated earnings tax, the taxation of partnerships, and of corporations electing to be taxed as partnerships. Three hours a week second semester.
MR. HAMBRICK

FEDERAL TAXATION III. The principal emphasis of the course is on the federal estate and gift taxes. Consideration is also given, however, to the related portions of the federal income tax dealing with the taxation of the income of estates and trusts and income in respect of a decedent. Three hours a week first semester. MR. JOHNSTON

INTERNATIONAL ECONOMIC RELATIONS. Legal framework of U. S. foreign trade and investment; foreign trade and investment laws of selected foreign countries; function of international economic law; international economic agreements; problems of foreign trade and investments. Three hours a week second semester. (Not offered in 1964-65.) MR. BAADE

INTERNATIONAL LAW. A survey of public international law of peace, as evidenced especially in decisions of national and of international courts; the drafting and interpretation of treaties; the nature of handling of international claims; the organization and jurisdiction of international tribunals, with special reference to the International Court of Justice; developments with respect to the codification of the law. Three hours a week first semester. MR. BAADE

LABOR RELATIONS. A study of the law relating to collective bargaining and concerted labor activities, including the National Labor Relations Act and related legislation, the legal aspects of strikes, boycotts and picketing, the negotiation and administration of collective bargaining agreements, procedures for the settlement of labor disputes, and relations between the union and individual employees. Three hours a week first semester. MR. LIVENGOOD

SEMINAR IN LABOR LAW. An intensive examination of significant problems in collective bargaining, union-management relations and labor dispute settlement, with emphasis upon the drafting and interpretation of contract clauses, theories and techniques in contract negotiation, grievance handling, voluntary arbitration and other procedures for the adjustment of disputes, and the inter-relation of the legal and economic aspects of labor problems. Two hours a week second semester.
MR. LIVENGOOD

SEMINAR IN MILITARY LAW. A study of military jurisdiction, the rights of military personnel, the body of both substantive and procedural law that has developed under the Uniform Code of Military Justice; in addition to its other goals, the seminar will seek to develop skills in statutory interpretation and to encourage comparisons between civilian and military criminal law administration. Two hours a week first semester. MR. EVERETT

SEMINAR IN REGULATED INDUSTRIES. Selected studies of government economic regulation in such regulated industries as transportation, broadcasting, and power, plus directed research and writing in specific problems of trade regulation. Two hours a week second semester. MR. HAVIGHURST

SEMINAR IN URBAN RENEWAL. A study of the urban renewal program, as implemented at the federal and local levels. Extensive field work is planned and urban renewal officials will meet with members of the seminar to discuss problems of implementing an urban renewal program. One hour a week first semester.
MR. EVERETT

SOCIAL LEGISLATION. Contemporary public welfare law, with emphasis on government regulation of conditions of employment, including the Fair Labor Standards Act and other wage-hour and child-labor statutes, unemployment insurance and other social security legislation, employers' liability and workmen's compensation acts, and related laws establishing minimum standards for the creation, continuance and termination of the employment relationship. In addition to

other objectives, the course will seek to develop skills in legislative advocacy and procedure, and in the drafting and interpretation of statutes. Two hours a week second semester. MR. LIVENGOOD

SEMINAR IN STATE AND LOCAL GOVERNMENT. State legislative creation and control of local governmental units, municipal police power, limitations on taxation, indebtedness, and expenditures of funds, bond issues, tort liability, annexation, eminent domain, subdivision regulation, public housing, and urban renewal. Considerable field work is planned. Two hours a week second semester. MR. EVERETT

SEMINAR IN TAX AND ESTATE PLANNING. See Property Courses, page 34, for description.

TRADE REGULATION. A study of the federal antitrust laws and their common law background, with emphasis on the economic policies involved, and of specific unfair trade practices and unlawful restraints at common law and under state and federal statutes. Attention is given to a critical examination of legislation designed to enforce competition as the primary control of the economic system; legal measures that supplement or replace competition; the relation of patents and antitrust; price discrimination; fair trade laws; regulation of advertising; trademarks and trade-names; appropriation of trade values; boycotts; and disparagement. Three hours a week first semester. MR. HAVIGHURST

SEMINAR IN WORKMEN'S COMPENSATION. The main elements of Workmen's Compensation Law of the United States are covered through the assignment of typical office problems on which legal memoranda or opinions are prepared. Two hours a week second semester. MR. LARSON

SEMINAR IN WORLD LAW. This is a discussion seminar open to students of the Law School and the Political Science Department, and to a limited number of other students with satisfactory backgrounds. The emphasis of this course is around those aspects of National law and International law which have an important influence on weakening or strengthening a world legal order. Detailed attention is given to the United States judicial decisions, other laws, and relevant policies effecting the relation of the United States to such a world legal system. Special attention is also given to decision of the International Court of Justice and to Constitutional treaties. The course will not duplicate the material in the regular course on International Law. Efforts are made through the seminar discussions to develop an adequate concept of world law. Three hours a week first semester. MR. LARSON

## *General Courses*

ADMIRALTY. The special body of law governing maritime affairs, especially the transportation of goods and passengers by water. Admiralty jurisdiction; marine insurance; carriage of goods; charter parties; general average; rights of injured seamen and others; collision; salvage; maritime liens and ship mortgages; limitation of liability; governmental activity in shipping. Three hours a week second semester. MR. CURRIE

COMPARATIVE LAW. An examination and comparison of the law of selected jurisdictions on certain specific topics. The history, sources, and methods of the civil law will be investigated, discussed, and compared with those of common law countries. Three hours a week, second semester. MR. BAADE

CONFLICT OF LAWS. A study of the special problems which arise when the significant facts of a case are connected with more than one jurisdiction. Recognition and effect of foreign judgments; choice of law; federal courts and conflict of laws; the United States Constitution and conflict of laws. Three hours a week first semester. MR. CURRIE

EQUITABLE REMEDIES. A survey of equitable remedies in general (including enforcement of equity decrees) and of important parts of the fields of equity

and restitution that are not covered in other courses. Two hours a week first semester. MR. PASCHAL

FAMILY LAW. Marriage; annulment; divorce; separation; property rights. Two hours a week first semester. (Not offered in 1964-65.) MR. BAADE

JURISPRUDENCE. Discussion of some of the basic problems of classical and contemporary juristic theory, with applications to cases and statutes. Open to all graduate students, and, with the consent of the instructor, to qualified second and third year students. Three hours a week second semester. (Not offered in 1964-65.) MR. HARDIN

LEGAL HISTORY. A study of the development of fundamental English and American legal institutions, with primary emphasis upon the establishment and growth of American law from the colonial period to the present. Two hours a week second semester. (Not offered in 1964-65.)

THE LEGAL PROCESS. A study of problems in the making and application of law and of the institutions for solving those problems. This has been called a course in "working jurisprudence." It deals with major jurisprudential concepts, not in the abstract but in an attempt to put them to work in the solution of specific legal problems. The problems cut across conventional course lines and include not only those confronted by courts, but also those confronted by private persons and their counsel, legislatures, administrative agencies, public officials, and others. Three hours a week first semester. MR. CURRIE

NORTH CAROLINA STATUTES AND DECISIONS. A study of selected statutes of North Carolina with discussion of their application, and an analysis of the decisions of the Supreme Court of North Carolina construing them. Two hours a week second semester. MR. BRYSON

PATENT LAW. A short survey of the law relating to patents and trademarks, with some coverage of copyrights, primarily to give the general practitioner a foundation in these areas to collaborate effectively with specialists. Special attention is given to overlapping problems in above-mentioned areas. One hour a week first semester. (Not offered in 1964-65.)

SEMINAR IN THE CONFLICT OF LAWS. Advanced study of selected problems in the conflict of laws. Research paper required. Two hours a week second semester. MR. CURRIE

TORTS. The bases of liability in damages for personal injuries and injuries to property; bases other than fault; negligence; intentional infliction of harm. Procedure in jury trials; proof of negligence; causation and "proximate cause"; defenses. Special rules applicable to occupiers and owners of land, motor vehicle accidents, suppliers of goods and remote contractors. Misrepresentation and fraud; defamation; assault and battery; false imprisonment. Three hours a week first semester, two hours a week second semester. MR. HARDIN

## *Procedure and Practice Courses*

CIVIL PROCEDURE. A study of the adjudication of civil cases with special emphasis on the Federal Rules of Civil Procedure. Three hours a week throughout the year. MR. PASCHAL

EVIDENCE. A study of the common-law rules of evidence, including the requirements of relevancy and materiality; competency and privilege of witnesses, examination and cross-examination, burden of proof and presumptions, judicial notice, and functions of judge and jury. Four hours a week first semester. MR. HARDIN

LEGAL PROFESSION. Lectures, discussions, and reading concerning the ethical problems and professional responsibilities of the lawyer. One hour a week second semester. MR. HARDIN

NORTH CAROLINA PRACTICE. A study of the steps in a civil action at law from the issuance of process to the entry of final judgment including service of process; appearance and waiver of process; selecting the jury; various motions made during the trial; submission of case to jury; verdict; judgment; noting and perfect-

ing appeal. Also included are such topics as jurisdiction of various courts in North Carolina; venue; trials without a jury; provisional remedies and special proceedings. Two hours a week first semester. MR. BRYSON

TRIAL PRACTICE. A study of the function of the advocate in the trial of law suits, with emphasis upon methods of pre-trial preparation and development of facts in court, typical uses of rules of procedural and substantive law in trial proceedings, and tactical and ethical aspects of problems which confront the trial lawyer. The course is open to third-year students who have completed the course in Evidence. Two hours a week second semester. MR. HARDIN

## *Legal Research and Writing*

DUKE LAW JOURNAL. One semester-hour of credit shall be accorded for each semester of satisfactory *Law Journal* activity as a competitor or as a member of the Editorial Board other than an officer; two semester-hours of credit shall be accorded for each semester of satisfactory *Law Journal* activity as an officer of the Editorial Board.

RESEARCH AND WRITING. Classroom instruction and individual problems in the use of law books, the preparation of memorandum of law, and moot court briefing and argument. Two semester-hours credit. MR. JOHNSTON

Upon recommendation of the Committee on Graduate Study, seminars not listed in the Bulletin may be created or arrangements made for supervision of special research by individual graduate students in any subject.

All matters presented in this Bulletin are subject to change as the University or the School of Law may deem expedient.

# THE SCHOOL OF MEDICINE

First term begins September 8, 1964
Second term begins November 9, 1964
Third term begins January 25, 1965
Fourth term begins March 29, 1965

# Admission

*I request that great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination and application evincing a wholesome and real ambition for life."*—James B. Duke.

Intelligence, character and integrity are the essential qualifications for admission.

A premedical student should be aware of the importance of a well-rounded general education as a preparation for the study of medicine and not limit himself to scientific courses. The Admissions Committee believes that the manner in which the college load is carried is of greater importance than the specific subjects taken. The premedical student would be better advised to secure a knowledge of the principles and a thorough appreciation of the interrelations of the basic sciences than to accumulate credits in many courses. He should learn how to work independently, to observe critically and to analyze rather than merely to store the information presented. Good study habits and use of time are perhaps the most important tools a student can bring to the study of medicine. His choice of studies beyond those required for admission should be governed by his own chief interests and by the intellectual stimulus to be derived from the work. In general he should avoid courses in subjects which are included in the medical curriculum.

## *Application for Admission*

Application forms may be obtained by writing to the Secretary of Admissions, Box 3710, Duke Hospital, Durham, N. C. Please do not send a request before August 1. Formal applications will be accepted by the Committee on Admissions only between 1 August and 1 December.

Due to the large number of qualified applicants to all medical schools, each student is urged to apply to at least four schools. In the event an applicant is accepted by another school before he has heard from Duke, and is forced to secure that acceptance with a deposit, he may request an earlier consideration by our Committee.

## *Requirements for Admission*

1. A minimum of ninety semester hours of approved college credit is necessary for admission to the School. It must include:

A. Two years of English. The second year should be chiefly expository English composition.
B. Two years of chemistry. The first year should be inorganic and the second analytic and organic.
C. One year of physics.
D. One year of biology and/or zoology.
E. One year of mathematics.

Strongly recommended courses but not absolutely required:

F. Embryology.
G. Calculus.
H. Genetics.

All science requirements must be completed not more than seven years prior to entrance.

2. Medical College Admission Test. This test is required of all applicants. It is administered by the Psychological Corporation, 304 E. 45th St., New York 17, New York. This test is given at many of the colleges throughout the country in May and October of each year. Arrangements for taking this test should be made by the student through his premedical advisor.

## *Selection*

Selection is made between September 15 and February 15 for the students entering the following September. The data on each candidate are carefully screened by the Committee on Admissions. A personal interview will be arranged for those with satisfactory credentials. If the distance from Durham is permissible the interview is conducted here; otherwise the candidates are referred to our regional representatives. Many factors are evaluated by the Committee in the selection process. Those students who show the most promise for exceptional future practice of medicine are admitted. The candidate is notified as soon as possible whether or not he has been accepted. If he has been accepted it is necessary to send a deposit of $50.00 by the succeeding January 15 in order to insure enrollment. This deposit is applied toward tuition. Inasmuch as admission must be offered a considerable period in advance of matriculation the admission must be provisional upon the successful completion of the remaining college work. In addition, a physcial examination is necessary prior to enrollment.

TRANSCRIPTS. A student who wishes to transfer his credits to another institution should direct his request to the Recorder, Duke University School of Medicine. Transcripts are furnished without charge.

## *Advanced Standing*

Applications for transfer into the second and third year classes will be considered only if space permits. No application for entrance to the fourth year will be considered. For entrance into the third year, Part I of the National Board Examination will be required as evidence of satisfactory accomplishment in the subjects of the first two years.

A limited number of transfer students from foreign medical schools may be admitted each year. Such students will be admitted into the third-year class in January only. During two nine-week terms, from January to June, these transfer students will divide their time between: 1) Clinical Microscopy, Physical Diagnosis and Psychiatry, and 2) a nine-week elective term. A faculty committee will plan the elective program for each student on the basis of his needs and interests. By attending two summer sessions, a transfer from a foreign medical school can receive his M.D. degree from Duke University approximately two and one-half years after matriculation.

## GENERAL INFORMATION FOR APPLICANTS

| | |
|---|---|
| Years of college work required for entrance | 3 |
| Resident and Non-resident tuition and fees for first year | $1412 |
| Estimated cost of equipment (books, supplies, etc.) first year | $265 |
| Estimated minimum cost of room and board for first year | $860 |
| Amount of non-refundable application fee | $10 |
| May give early decision to applicant preferring this school but offered a place in another school | Yes |
| Medical College Admission Test required | Yes |

### 1964-65 FIRST YEAR CLASS

| | |
|---|---|
| Size of first year class | 80 |
| File application for admission between | Aug. 1, 1964<br>Dec. 1, 1964 |
| Applicant will be notified of action on his application between | Oct. 1, 1964<br>Feb. 15, 1965 |
| Amount of deposit fee required on or after January 15, 1965, to hold place in class if applicant is accepted Deposit refundable before January 15 | $50.00 |
| Date entering class starts program | Sept. 7, 1965 |

Address inquiries to:
Secretary of Admissions
Box 3710
Duke Hospital
Durham, N. C.

# Financial Information

## *Fees and Expenses*

Listed below is a table of the approximate expenses for the normal four term academic year of the School of Medicine:

| | |
|---|---|
| Tuition and fees | $1412.00 |
| Board | 600.00 |
| Room | 260.00 |
| Books | 135.00 |
| Laundry | 100.00 |
| Insurance, instruments and incidentals* | 160.00 |
| | $2667.00 |

One fourth of the total fees is payable by the Friday preceding each nine-week term. A fine of $5.00 is charged for late registration after this time. No credit will be given for any term in which the tuition has not been paid, whether the work has been done here or elsewhere.

It is not advisable for students to attempt outside work to defray their expenses during the academic year. The curriculum is so crowded that the results usually are disastrous to the student's health and academic standing.

## *Availability of Financial Assistance for Medical Education*

With the increasing cost of medical education, the need has also increased for financial assistance to deserving students. Three kinds of aid are currently available: scholarships or fellowships; loans; and cash awards.

## *Scholarships or Fellowships*

a. THE CHARLES ALVA STRICKLAND MEMORIAL FUND SCHOLARSHIPS may cover up to full tuition costs. This scholarship may be renewed for each of the years after the first year. Merit and need are taken into consideration.

* Microscope, sphygmomanometer, ophthalmoscope, otoscope, and other equipment, which are required of each student and which must conform to rigid standards, may be obtained on a rental basis from the University.

b. THE DR. HILLORY M. WILDER SCHOLARSHIP FUND covers full tuition for each of four years and is awarded on the basis of merit and need.

c. THE DUKE MEDICAL SCHOOL ALUMNI SCHOLARSHIPS are awarded to outstanding students, irrespective of financial need. These honorary scholarships carry an annual stipend of $500.00 per year for each of four years.

d. THE PFIZER Scholarship, offered by Pfizer Laboratories, a Division of Charles Pfizer & Co. Inc., is an award of $1000 granted to a student selected on the basis of merit and need.

e. THE MANOOCHERIAN-ROBBINS FOUNDATION SCHOLARSHIP of $500.00 for one year is granted to one outstanding student each year. This award is made as a supplement to a student who has already been awarded some other scholarship aid.

f. STUDENT RESEARCH FELLOWSHIPS are available as part of an extensive program, designed to encourage the medical student to participate in research. Summer Fellowships carry a stipend of $200.00 per month. These Fellowships enable a student, after completion of his first year, to participate in research during a summer vacation or other free time. Special Fellowships in Nutrition, Ophthalmology, Allergy and other fields are also available. Opportunities also exist for a student to engage in research for an entire year during which time he temporarily discontinues his medical course. These Post-Sophomore Research Fellowships carry a stipend of $3200 per year plus an allowance for dependents and tuition expenses. In special circumstances these Fellowships are tenable at institutions other than Duke Medical Center and outside the United States. Information may be obtained from Dr. E. Croft Long, Box 3195, Duke University Medical Center.

g. THE WILBURT C. DAVISON SCHOLARSHIP was instituted to enable a medical student to widen his experience by clinical study outside of the United States. One award of $500.00 is made each year. Information may be obtained from Dr. E. Croft Long, Box 3195, Duke University Medical Center.

## *Loans*

a. THE ANGIER B. DUKE MEMORIAL LOAN FUND covers amounts up to full tuition for each of four years.

b. THE W. K. KELLOGG FOUNDATION FUNDS are available for amounts up to full tuition for each of four years.

c. THE FRANCIS AND ELIZABETH SWETT FUNDS are immediately available to students with emergency need. These loans are usually small, on a short-term basis.

Loan funds are administered in accordance with the following regulations:

1. No loan will be made to a student who violates any of the regulations of the University or who is not doing outstanding classwork.

2. Loans will be made only to students who are taking full courses of study that lead to a degree. All loans except the Swett Fund must be arranged not later than July 1 of each year.

3. Every applicant for a loan must present with the application such security as the President of the University may approve, and no money will be advanced before a note with approved security is in the hands of the Treasurer of the University.

d. NORTH CAROLINA STATE LOANS are available to worthy students who agree to practice in a North Carolina rural area or small town of less than 2500 population for at least four years after the completion of their professional training. To be eligible a student must have been a resident of North Carolina for the past eight years. The maximum loan to a medical student is $1,400.00 per academic year ($5,600.00 for a four year period). The student who receives a loan must, immediately following completion of the four year medical course, take a rotating internship of one year and if approved by the Medical Care Commission, he will have the option of continuing the internship through a second year. Detailed information can be obtained from the North Carolina Medical Care Commission, Post Office Box 1880, Raleigh, North Carolina.

## *Cash Awards*

THE BORDEN UNDERGRADUATE RESEARCH AWARD IN MEDICINE is an award of $500.00 to be given to the Duke senior who, in the opinion of the Committee on Health Affairs, has performed the best research work during his or her entire medical course, including that done during the preclinical years. Applicants should submit their papers, articles or reprints to the Dean at least three months prior to expected date of graduation.

THE TRENT PRIZE IN THE HISTORY OF MEDICINE is an annual award of fifty dollars for the best original and publishable essay on any topic in the history of medicine or its allied sciences by a Duke medical student or house-officer. It was established by Mrs. Mary Trent Semans in memory of the late Dr. Josiah C. Trent, who was Assistant Professor of Surgery in charge of Thoracic Surgery and who greatly increased the interest of the staff and students in medical history. Essays should be submitted to Dr. Joseph E. Markee, by April 1 of the year in which they are to be considered.

THE ROBERT U. YOUNG AWARD was established by friends and classmates of the late Robert U. Young (M.D. '51). An outstanding second year student, selected by the Dean, receives all of the basic equipment needed except for the microscope.

# Curriculum



The academic year consists of thirty-six weeks. For third and fourth-year students there will be four terms of nine weeks each. In the first two years the instructional program does not adhere rigidly to the above terms, but rather involves interdepartmental correlations. The third year is made up of nine-week terms of medicine, surgery, obstetrics-gynecology and psychiatry. The fourth year is comprised of nine-week terms of medicine, surgery and pediatrics and one term as an elective. Elective courses have been organized for small groups, or the time may be utilized in independent work (including research) in any department, clinical or preclinical. Arrangements for taking such courses or doing other work are made through the Curriculum Committee.

Students are encouraged to take a portion of their medical school work at other schools. Permission must be obtained in advance from the Committee on Health Affairs and the full tuition at Duke must be paid for that quarter. If the charges at the school at which the work is taken are less than those at Duke they will be paid by Duke and if more, the difference must be made up by the student. At the completion of the work in another school an examination in the subject may be conducted by the department at this medical school.

## *Promotion*

The records of each student in the first and second years are reviewed periodically by special Promotion Committees, which are made up of the preclinical Department Chairmen. The Committee on Health Affairs acts on recommendations from these Promotion Committees and may:

1. promote to the next year those students whose work is satisfactory.
2. warn those students whose work is below average that they must improve their scholastic endeavor.

3. place on probation those students whose work is very unsatisfactory.
4. request the resignation of any student who is considered an unpromising candidate for the degree of Doctor of Medicine.

A student wishing to appeal this decision may do so to the Chairman of the Committee on Health Affairs within two weeks of his notification.

The Committee on Health Affairs reserves the right to require the withdrawal of any student at any time if, in the opinion of the majority of its members, he should not continue his course.

At the end of the second year each student will be required to take Part I of the National Board Examinations.

The Medical Research Training Program is an elective program available to qualified students after completion of the first two years of the curriculum, and to members of the Duke Hospital resident staff, Postdoctoral Fellows in the clinical and preclinical departments and qualified graduate students.

The objective of the program is to provide a more sound basis for the future work of those hoping to devote their lives to a career in investigative medicine and biology. Approximately 8 medical students and 8 postdoctoral fellows are accepted annually. Applicants are admitted upon recommendation by a faculty committee on the basis of a past academic performance, evidence of research bent and curiosity, and motivation toward an academic research career.

The program offers an academic year (September to June) of full-time research training in medical sciences basic to clinical investigation, and emphasizes primarily "cell biology." It includes three types of activities: 1) Three months are devoted to an extensive series of laboratory experiences in cytology and fine structure, cell and tissue culture, biochemical studies of cell growth, bacterial and phage genetics, protein synthesis and its genetic determination, physical biochemistry of nucleic acid and of proteins including antibodies and enzymes, membrane functions, and organized cellular controls. These three introductory months are designed to familiarize the student with concepts and experimental approaches in these fields, and with the use of important and complex tools and techniques not ordinarily taught in undergraduate courses. 2) Six months are devoted to a research problem conducted either in the general laboratory set apart for this program or in the laboratory of one of the faculty with whom the participant chooses to work. 3) Seven hours per week, throughout the year, are devoted to class work in mathematics, biostatistics and bioelectronics in courses expressly designed for students of this program, and one evening each week is devoted to seminar work. Special lectures are given by guests from the university faculty or from other

institutions. The entire program is housed in a special wing of the W. B. Bell Medical Research Building, and is under the direction of members of the faculty who devote themselves largely to this training program.

The qualified medical student can participate in this program without delaying his graduation and without increasing the cost of his education. By using two summers of clinical studies, and by receiving elective credit for two of the four quarters in the training program, he enters his senior year abreast of his class. He receives a training stipend of $200 per month during the program. He ultimately pays the same tuition as any other medical student.

The Graduate School of Duke University will also accept the total of the first two years of medical school plus participation in this program as residence time toward the degree of Doctor of Philosophy. In addition, the individual student must satisfy the language and dissertation requirements of the Graduate School and any special requirements stipulated by the department in which he elects to obtain this degree. The combined degree program is arranged individually and requires a minimum of 5½ to 6 years.

It is suggested that medical students undertake this program at the completion of the first two years of the curriculum and then return to the normal clinical medical curriculum. Such students should also expect to undertake one or two years of a postdoctoral research fellowship in the course of their residency training in order to prepare themselves fully for an academic research career.

## *Undergraduate Cancer Training Program*

The student is instructed in cancer problems by ward assignments, tumor clinics for the undergraduate student, and special lectures and courses given by various departments. During the third year, the student studies ward patients with a clinical instructor from the departments of surgery, obstetrics and gynecology or pediatrics. The student participates in all phases of the care of patients with cancer (diagnosis, pre- and post-operative care, and assisting in the operation). He observes the lesion in situ, examines it in the fresh state, follows the specimen through the pathologic laboratory, and studies the prepared slides for microscopic appearance, thereby learning pathology techniques and checking on the accuracy of his own diagnosis. Interdepartmental tumor clinics offer combined teaching by the pathologist, radiologist, surgeon, gynecologist and pediatrician, and teach the student the techniques and value of each of these disciplines, as well as giving the student a comprehensive review of the special cancer problems. Special courses given by the radiology and

pathology departments teach the use and value of diagnostic and therapeutic x-ray and diagnostic surgical pathology in handling the cancer patient.

The training program is supplemented by a tumor registry where accurate follow-up records are kept with the results summarized and made available to staff and students. Thus they can know the year by year results of treatment of large numbers of patients as expressed in percentages of those (1) free of recurrence, (2) apparently cured, (3) having a recurrence, or (4) dead of recurrence at varying times after onset of the disease and the institution of therapy.

# General Information

## *Introduction*

Duke University Medical Center was established in 1930, through the munificient gift of the late James B. Duke. The School of Medicine and Hospital are located in the same building complex situated on the campus of Duke University. Both have been planned to insure the greatest correlation between the various departments. The students in the School of Medicine are accorded the same privileges and are subject to the same laws and regulations as those of the other divisions in the University. Eighty students are admitted to the first year class each year and on September 3, 1963, three hundred and forty students were enrolled.

## *Aims of the School*

Duke University School of Medicine, from its beginning in 1930, has maintained as its major objectives: a) the cultivation and teaching of medicine on a strictly scientific basis; b) the correlation of medical research with medical teaching at all levels of its teaching; and c) the continuous search for an experimentaton with new or improved methods of teaching scientific medicine. From these basic objectives, the following implementation has been effected:

a. The standard curricula is designed to provide a strong academic basis for a lifelong growth within the profession of medicine and is intended to foster development of attitudes of skepticism and inquiry, of technical competence, and proficiency in the arts peculiar to the

practice of medicine, as well as inculcate and appreciation of its broader social responsibility and potential role of service.

b. Elective opportunities are made available whenever possible, to permit early differentiation of students along lines of talents and interests, and to encourage early career decisions that will lead to wise investments of time and to scholarly efforts.

c. Among the special opportunities offered are those designed to provide model experiences in the practices of medicine, as well as those designed to attract qualified students into research and teaching.

d. The Medical School takes active measures to perpetuate its own disciplines. This includes development of strong pre- and post-doctoral training programs with sufficient flexibility to accommodate students with widely divergent career goals. Such programs are based on scholarship to produce leaders for the profession, both in contribution of knowledge and in excellence of action.

In order to attain these objectives, the School has been organized, its physical plant planned, and its administrative structure constituted so that there exists the closest possible academic and physical relationship between undergraduate and graduate work in the University and the School of Medicine, and also between the basic medical sciences and the clinical sciences within the School and its integrated teaching Hospital.

The professional staff of the School is composed of two general categories; those with permanent appointment and unlimited tenure, and those with temporary appointment. The latter, the much larger group, is maintained on a highly fluid basis, which makes possible a high degree of selectivity in appointment for academic training and scientific research. The smaller group of permanent appointees has in every individual a background characterized by academic and scientific attainment. The professional, academic, and scientific environment created by the staff is thus such as to engender scientific inquiry and to encourage diligent pursuit of the medical sciences in all their relationships. The staff at all levels devotes its entire professional time to the activities of the Medical Center.

## *Degrees*

*Doctor of Medicine.* The degree of Doctor of Medicine is conferred on those who have completed the curriculum of the School of Medicine to the satisfaction of the Committee on Health Affairs. In addition, each candidate for this degree is required to sign an agreement that he will spend at least two years of the succeeding three years in hospital or laboratory work acceptable to the Committee on Health Affairs. This required period of approved hospital or laboratory work may be active duty in the Armed Forces or the U.S. Public

Health Service. As a guarantee of this pledge the diploma is deposited in the Central Records office until the additional training is completed. A temporary certificate is issued at the time of graduation which must be returned prior to the delivery of the permanent diploma. Failure to fulfil this agreement constitutes a waiver of any claim to possession of the diploma and the degree of Doctor of Medicine.

*Bachelor of Science in Medicine.* The degree of Bachelor of Science in Medicine is conferred upon those students who have fulfilled the following requirements:

1. Satisfactorily completed eight terms in the Duke University School of Medicine.
2. Obtained approval of a research program by the head of the department in which the work is to be done.
3. Obtained written permission from the Committee on Health Affairs for the program.
4. Completed creditable investigative work, under the supervision of an Advisory Committee appointed by the Chairman of the appropriate department.
5. Completed a written report of the investigation which has been accepted by the Advisory Committee and submitted two bound copies and one unbound copy to the Dean at least two months prior to the expected date of graduation.
6. Passed an examination upon the subject of investigation before the Advisory Committee.

No credit toward this degree is given for additional college work. All students in good standing are encouraged to undertake work toward this degree, in addition to their work toward the degree of Doctor of Medicine.

*Master of Science and Doctor of Philosophy.* Work leading to each of these degrees may be pursued in the preclinical departments. For further details concerning conditions under which these degrees are awarded consult the Bulletin of the Graduate School of Arts and Sciences.

## *Facilities*

*Duke Hospital,* an integral part of the Medical Center, is a 650-bed, 30-bassinet general hospital which performs the concurrent functions of patient care and professional education. It admits over 20,000 patients a year, and maintains comprehensive diagnostic and treatment facilities for their care.

Different levels of patient care are provided by a minimal care unit and intensive care facilities in addition to conventional nursing

units. Private, semi-private, and ward accommodations are available. Approximate daily patient census by service is as follows: Surgery (including Urology, Otolaryngology, Ophthalmology, and Orthopaedics), 250; Medicine (including Dermatology and Neurology), 160, Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include 18 operating rooms and a recovery room. Over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained.

Outpatient services include a public clinic which totals over 120,000 visits a year, a private diagnostic clinic of comparable size, and an active emergency service. All of the hospital components are located within a single interconnected building complex. Close working relationships between Duke Hospital and outside health agencies contribute to continued care.

The clinical faculty of the Duke University School of Medicine, which is composed of 130 specialists, forms the medical staff of Duke Hospital. This group participates in both undergraduate and graduate medical education, and in active medical practices within the hospital and the private diagnostic clinic.

Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association, and conducts an active educational program involving approximately 300 house staff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

*Teaching and Research Facilities.* In addition to those carried on in Duke Hospital patient areas, classrooms, and laboratories, teaching and research activities are also carried on in the Davison (Medical School) Building, the Diagnostic and Treatment Building, the Gerontology Building, the Clinical Research Building, and the William B. Bell Research Building. Except for the Bell Building, each is a part of a single building complex.

*Veterans Hospital.* The Durham Veterans Administration Hospital is located within walking distance of the School of Medicine. This 485 bed general hospital was opened in April, 1953. Its fulltime professional staff are all members of the faculty of Duke University School of Medicine and the house staff training at the Veterans Hospital and Duke Hospital are closely integrated.

## *Library*

The Medical Center Library attempts to provide all services and collections necessary to further educational, research and clinical activities in the medical field. Extensive reference and bibliographical service is provided. The collection exceeds 70,000 volumes and about

1300 current periodicals are being received, over one hundred of them in duplicate subscriptions.

The Trent Collection in the history of medicine is an unusually fine one, rich in manuscripts and rare books, and providing opportunity for study and research as well as casual reading in the field.

## *Medical Care*

With the exceptions noted below, full medical and surgical care is furnished to all regularly matriculated medical students of the University who have paid the quarterly General Fee. This service is under the direction of the Physician-in-Charge with the co-operation of the staff of the Duke University Medical Center. It includes hospitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward but not special nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernia, elective surgery, chronic skin conditions, endocrine disturbances, etc., or accidents or illnesses occurring during vacations or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as of special nursing must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care.

# Central Television Facility



Sam A. Agnello, A.B. (Duke 1939), *Coordinator of Medical Television.*

The functions of this unit include television service directed toward the instruction, research, and patient care programs of the Medical Center. Another function is that of conducting continuing research in evaluation studies and in the development of television utilization.

The original television system was installed in November, 1960, in the Anatomy Department for experimentation in the utilization of television in teaching and research. Dr. J. E. Markee, *James B. Duke Professor of Anatomy and Chairman of the Department of Anatomy,* led the way for this experiment. Mr. S. A. Agnello and Dr. F. D. McFalls, *Assistant Professor of Anatomy,* assisted him. During the period following this time, television has been used as a communication medium in the following courses of study for medical students, house staff, nursing students, physical therapy students, and graduate students: gross anatomy, neuroanatomy, physiology, pathology, medicine, psychiatry, radiology, and in the medical career orientation lecture series. A collection of videotaped material is available as cores for teaching presentations. Research and patient care applications of television have been undertaken by the Department of Medicine (Cardiovascular Laboratory and Medical Outpatient Clinic) and are projected by the Psychiatry Department.

The television system is designed to enhance the multimedia approach for instruction. The television control center is capable of interdigitation of all audio and video signals originating from TV cameras, a motion picture-opaque-slide pick-up device, and videotape recorder. Mobile cameras, monitors (receivers), and the wide-screen TV projector may be used in 21 specific locations throughout the Medical Center. These locations include all major classrooms. With the use of extension cables, other locations may be reached. Four-channel capability is a built-in feature of the system.

Although no formalized study in educational television is provided, individual training programs are available for those who wish to pursue medical television as a career. Consultation and training programs are designed for those who wish to utilize television in their professional activities.

# Departments of Instruction

## *Anatomy*

The required courses of instruction in human anatomy constitute about half of the integrated curriculum of the first year. The gross anatomy of the head, neck and trunk is studied during the first 14 weeks, histology during the first 10 weeks, neuroanatomy during the 28th to 36th weeks. The gross anatomy of the limbs is studied during the 19th to 27th weeks. All of the above are integrated with the other material studied during the first year. Emphasis is placed upon the study of the material in the laboratory. In an attempt to utilize more fully the laboratory time, audio-visual educational methods are employed as fully as possible. These techniques consist of color motion pictures of demonstration dissections, closed-circuit television, color lantern slides, and motion pictures, both embryologic and neurologic. All of the instruction is designed to be as informal and as nearly individual as possible. General principles and the functional viewpoint of living anatomy are stressed in the hope that the student may be stimulated to secure a working knowledge of anatomy in the broadest sense. Whenever possible, fresh tissues and living cells are made available for examination. Patients exemplifying anatomical principles are presented, some within the classroom, others over live television, and others are pre-recorded on videotape for later presentation at the appropriate time in the students' learning experience. Through the co-operation of the Department of Radiology, the students are given an opportunity to study portions of the living human body as revealed by the fluoroscope and roentgenograph. The following elective courses are offered:

*Demonstrations in Anatomy.* Using dissections already prepared, weekly demonstrations of selected regions or systems are made by the members of the group. Sixth quarter—Two hours per week by arrangement. Second-year students in groups of 10.

*Review in Anatomy.* During the sixth quarter, a review in anatomy will be presented by the audio-visual education methods outlined above, covering gross and neuro-anatomy, and histology.

*Special Neuro-anatomy.* Laboratory work and conferences upon selected portions of the human central nervous system. Limited to 6 junior or senior students. Two hours weekly by arrangement.

*Brain modeling.* Free-hand reconstruction in clay, from gross

and sectioned material, of the chief tracts and nuclei of the human brain stem. By arrangement—4 to 10 students.

*Experimental Neurology.* An operative and laboratory study of the effect of various lesions upon the central and peripheral portions of the nervous system. Four to eight junior and senior students by arrangement. Prerequisite—operative surgery.

*Advanced Studies in Anatomy.* These may be arranged at any time under the direction of the various members of the staff.

*Review of Orthopaedic Anatomy.* A one hour weekly review of the anatomy related to orthopaedic surgery.

*Review of Surgical Anatomy.* A one hour weekly review of the anatomy related to general surgery.

*Anatomy Seminar.* One hour weekly meeting of students and staff in which current research problems in anatomy are presented.

*Interdisciplinary Seminar in the Physiological and Anatomical Bases of Behavior.* Weekly meeting of students and staff in which current problems in Anatomy, Physiology and Psychology Behavior will be presented. Many of the presentations will be made by visiting scholars who will also be available for small group discussions.

## *Biochemistry*

The required course in biochemistry for first-year students is given over a period of twenty weeks in the fall and winter. The first phase is devoted to a survey of the chemistry of the materials fundamental to all life proteins, fats and carbohydrates, and the nature of enzymatic action. This is followed by consideration of those events in intermediary metabolism common to the life of all mammalian cells. The special metabolism of muscle, kidney, bone, erythrocytes, liver, connective tissue, and the chemical aspects of digestion, respiration, electrolyte, acid-base and fluid balance are presented with relation to the study of the physiology of these organs so as to facilitate integration and correlation of the two disciplines.

Since the success of the students in this course is largely determined by the adequacy and ready availability of their premedical training, it is urged that all students review the fundamental laws, theories, and facts of chemistry before the beginning of the course. A circular outlining the topics requiring special attention is sent to all students upon admission. Additional copies of the circular may be obtained from the Dean's Office.

*Biochemical Research.* The facilities of the department, including various types of research equipment and the clinical material of the blood chemistry laboratory, are available to properly qualified students for independent or supervised investigations. Chemical investigations

of problems in biochemistry or in conjunction with the clinical and pathologic departments also may be conducted.

*Physical Biochemistry.* A four hour lecture and seminar course is given in the spring term.

*Nucleic Acids.* A two-hour lecture and seminar course is given in the spring term in alternate years.

*Intermediary Metabolism.* A four hour lecture and seminar course is given in the fall and spring terms.

## *Endocrinology*

The Division of Endocrinology was organized by Dr. E. C. Hamblen in 1936 as a division of the Department of Obstetrics and Gynecology. In 1955 it was reorganized as an integrated service with a staff drawn from several clinical and preclinical departments. Its objective is to give comprehensive training in basic and clinical endocrinology and metabolism, particularly at the postgraduate level. Although individual senior staff members have their own special clinical and research programs, the division is organized so that clinics, conferences, ward rounds and seminars are participated in as joint ventures by the entire staff. The endocrine laboratory and its services are available to all members of the staff equally. Resident physicians from Medicine, Obstetrics and Gynecology and Pediatrics rotate through the Endocrine Division. At any one time there are usually four residents assigned to the division. Clinical and research fellows and trainees are assigned to individual senior staff members, depending on their major interest, but all participate essentially equally in the clinics, teaching rounds, conferences, etc.

The Endocrine Clinic meets four mornings and the Metabolism-Diabetes Clinic one morning each week. All fellows have the opportunity to attend these clinics and in addition the clinical fellows assist in the care of the private patients with endocrine and metabolic disturbances including diabetes. Twice a month the endocrine clinic meets jointly with the neurosurgical tumor follow-up clinic to review patients with pituitary tumors and related brain lesions. Ward rounds on in-patients are held from 4-5 p.m. Monday and Friday and at 9 a.m. on Wednesday each week. An endocrine conference is conducted weekly. In addition, each of the supporting services (Medicine, Obstetrics and Gynecology and Pediatrics) has special conferences, lectures and seminars of endocrine interest which are available to the staff.

## *Medicine*

The Department of Medicine traditionally has the responsibility of preparing the student for a lifetime of learning as he gives care to

patients who ask him for help. The first step is to begin to think and act like a doctor. Two courses in the second year—Introduction to Clinical Practice and Clinical Microscopy—prepare the student so that he can take an active role in patient care.

In the third and fourth years, the student assigned to Medicine acts in the role of a physician. His desire to give good care is the motive which drives him to excellence. He learns to properly identify the problems of the patient. Having identified the problems, he marshalls the information which he can bring to bear on them by his past training; he recognizes the gaps in his knowledge as he attempts to focus the information learned from the basic sciences onto the specific clinical problem. Using the patient as his means of integration, he re-reads his anatomy, physiology, microbiology, pharmacology and biochemistry. In this clinical setting he has the opportunity to speak many words which he has previously only read; he discusses the problem with his fellow students, interns, residents and senior staff; he gains familiarity with ideas and concepts by actively manipulating them.

The student crystallizes his idea of the best diagnostic and therapeutic approach to this particular patient. He identifies the reasons for each of these decisions. He has real curiosity to see if his evaluation of the situation is correct or if he will have to admit that certain data which he had interpreted as rock-like support for his house of cards have turned out to be shifting sand. He learns that the course of biology is uninfluenced by strong statements, by the rank of the faculty member, or by the number of supporting references not quite applicable to the points in question.

Under guidance from his fellow students and from faculty of all ranks, he slowly appreciates the difficulties of learning in this system of multiple variables operating on only partially defined substrates. Part of a doctor's learning is only experimental. He knows from living with his patients that certain things are possible, but he does not know the underlying sequence of events. In other instances, his learning is more precise because he understands and can control some of the important variables. He must learn both the liabilities and virtues of attempting to use logic in clinical practice.

The goal of the Department of Medicine is for the student to have as many learning experiences as possible in which he plays an active role. We hope that he will enjoy these learning experiences so much that he will continue them as long as he sees patients. We are not interested in covering the entire field of medicine. If one of our graduates meets a new problem, correctly identifies it and has pleasure in solving it, we are satisfied. We are not concerned that a new area of knowledge is being explored without our guidance.

In caring for our patients with ill-defined genetic and acquired differences and with many variables of unknown strength at play, many erroneous conclusions are drawn. The student has to learn to examine statements both oral and written with care and to ask of all authorities the source of data which underly their conclusions. One way for the student to learn the difficulties in drawing accurate conclusions about biological systems is to give him the opportunity to establish some fact on the basis of his own work. We call this research and find it a very effective method of teaching. The intellectual discipline involved better prepares him for the role of a lifetime learner.

The health field is a broad one. Anyone with intelligence enough to gain entrance to the Medical School can find an area where he can be happy and productive. We are interested in producing manpower for the entire field. We are not interested in molding our students into any single career in the health field. The faculty accepts the fact that our intake is heterogeneous and that our output will be heterogeneous. Our role is to identify the area where the individual will be most productive and happy, and to help him reach this goal. We will continue to produce general practitioners, specialists, administrators, research workers, biologists, government workers and various combinations. There is no special honor attached to any of these roles. Our primary interest is that our graduates are productive, and receive emotional and intellectual satisfaction from their work.

*Introduction to Clinical Medicine.* This course is initiated in January of the second year by introductory lectures, case discussions and instruction in methods of physical examination and history taking. Early in the course, students begin work at the bedside in the examination of selected patients. The emphasis throughout is placed on instruction individually and in small groups. The interpretation and pathologic physiology of abnormal findings are stressed. Instruction in the more specialized methods of examination is provided by coordinating the lectures, case discussions and individual student instruction from the departments of Medicine, Neurology, Obstetrics and Gynecology, Pediatrics, Psychiatry, Radiology and Surgery. In addition, the lectures and laboratory sessions in Clinical Microscopy are coordinated with the over-all program. In the latter part of the year special emphasis is placed on student correlation of the history, physical finding and pathologic physiology in the individual patient problem.

*Clinical Microscopy* is given in the second year. This course, along with lectures and assignments providing practice in history taking and physical diagnosis, comprises an introduction to medicine designed to equip the student to participate in patient care on the wards and in the clinics. The essentials of hematology are reviewed. Laboratory

work includes blood cell counts, the preparation and interpretation of blood films, and the examination of fresh material, such as urine, stools, spinal fluids, sputum, transudates and exudates. Second-year and senior students are given opportunities for special work and for investigation. This course is supplemented in the junior and senior years by hematology conferences and by daily ward and laboratory rounds.

*Junior and Senior Medicine.* The student usually spends one term of his junior and senior year in Medicine where he is assigned to one of the medical wards or to the medical clinic. He forms part of a medical team composed of third- and fourth-year students, interns, first-year residents and senior staff, and takes an active part in the care of patients. The number of patients assigned to him does not vary with the load. He is given this protection to allow him time for synthesis of his basic science experiences with the problems of his patients. When indicated, the undergraduate experiences are integrated with the graduate program. In such an instance, the program of each student is worked out individually.

Many students take an elective term in one of the following medical specialties:

Allergy—Drs. Hansen, Sieker and Buckley
Behavioral Medicine—Drs. Bogdonoff and Klein
Cardiology—Drs. Orgain, Estes, Floyd, McIntosh and Whalen
Chest—Drs. Kilburn, Menefee and Saltzman
Dermatology—Drs. Callaway and Smith
Endocrinology—Drs. Wyngaarden, McPherson, Wynn, Bressler and Lebovitz
Gastroenterology—Drs. Ruffin, Tyor and Owen
Hematology and Cancer Chemotherapy—Drs. Rundles, Laszlo, Silberman and Mengel
Hypertensive Vascular Disease—Drs. Kempner and Peschel
Infectious Diseases—Drs. Osterhout and Flanagan
Metabolism—Drs. Nicholson, Lynn and Bressler
Neurology—Drs. Heyman, Pfeiffer, Peele and Warner
Renal Disease—Dr. Robinson
Rheumatoid Diseases—Drs. Persons and Kerby
Therapeutics—Dr. Hendrix
Metabolic Diseases of Genetic Origin—Drs. Wyngaarden and Elder

Students who have elected to take a year in the Research Training area and are going to take graduate work in Medicine or Pediatrics are not required to take Senior Medicine. Any student of unusual ability who is going to take graduate work in Medicine may modify

the undergraduate program in Medicine in ways which will make his graduate experience more profitable.

## *Microbiology and Immunology*

*Bacteriology, Immunology, and Mycology.* The required course is given in the first term of the second year. An intensive study is made of the common bacteria, fungi, and viruses which cause disease in man. The scope of the laboratory course is reasonably wide and acquaints the students with all the methods and procedures employed in bacteriologic laboratories. Most of the lecture time is devoted to the immunologic and epidemiologic aspects of infection. The instruction is designed to give the students a clear conception of: (1) how organisms gain entrance to the body, (2) the type of poisons which they produce, (3) the nature of the immune bodies which are produced by the host, and (4) the methods of preventing the disease by active and passive immunization.

*Research Microbiology.* Opportunities for original investigations are afforded a few specially qualified students.

*Clinical Microbiology.* During their clinical clerkships on medicine (one quarter each for junior and senior classes), the students may perform the routine and special bacteriologic work of the patients assigned to them on the teaching service, under the direction of the Department of Bacteriology and in parallel with the Biologic Division of the medical clinic.

*Immunology.* Emphasis is placed upon the informal teaching and training of those students who have a special interest in the general field of immunology. An elective course of lectures in advanced immunology together with a seminar series is given to students who have completed the course in Bacteriology and Immunology. Besides reviewing recent developments in knowledge about the induction of immunity and the production of antibodies, the course covers the actions of complement, the reactions of the vascular system and of immune cells, and the mechanisms of auto-immune and immunogenetic processes. A large colony of inbred animals is maintained which may be used for research purposes by graduate and senior students wishing to use the laboratory facilities for their own projects under supervision of the staff.

## *Obstetrics and Gynecology*

Second year students receive 22 hours of instruction in the fundamentals of Obstetrics, Gynecology and Endocrinology during their course in physical diagnosis.

During one quarter of the junior year each student group attends Ward Rounds at 8:30 a.m. on Mondays, Wednesdays, and Saturdays; Preoperative and Pre-delivery Conferences on Tuesdays, and Fridays; tutorials on Mondays, Tuesdays and Wednesdays; Pathology Conferences on Thursdays and Staff Meetings on Fridays with members of the staff and the staff of other departments. They also attend an Endocrine Clinic once a week; an abnormal Obstetric Clinic once a week; and the regular Out-Patient Clinic five times weekly for nine weeks. The students are also assigned patients on the Obstetric and Gynecologic Wards.

## *Pathology*

*General Pathology:* The course in general pathology is giving during the first and second terms of the second year. The fundamentals of pathology are presented to the student by a correlated study of gross and microscopic material illustrating the structural changes in disease. Lectures developing broad concepts of disease processes are given by the members of the senior staff. Conferences with small groups of students under the guidance of a staff member are scheduled for purposes of more intimate discussion. The emphasis is placed on etiology and pathogenesis of disease and the experimental approach to an understanding of disease. Animal experiments performed either by students or by demonstrators are used to correlate functional and structural changes in disease. The group work is supplemented by weekly conferences involving the class as a whole and dealing with problems presented by current autopsies and with other problems of general importance. Student collaboration in post-mortem studies is required. Cases thus studied are presented by the student before the class under the direction of the staff; this takes the form of a clinical-pathologic conference in which each student plays a particular role.

*Elective Courses.* Special courses in pathology are given to students who have completed the course in general pathology. These courses are available through special arrangement.

*Clinical-Pathologic Conference (CPC):* A weekly clinical-pathologic conference for advanced study is held on Saturdays. It is open to all persons interested. Attendance by all the students is expected. Miscellaneous weekly pathologic conferences dealing with current cases under treatment on the various services are held for instruction of the staffs concerned.

*Student Research.* Research facilities are provided for interested students. Those who desire to carry out investigative work are given

every encouragement and are allowed to work independently or in collaboration with the staff.

*Postgraduate Instruction:* The Department is composed of senior members, fellows and resident staff. The fellows and residents are active teachers as well as advanced students of disease. Ample opportunity for the development of a career in the field of pathology is provided for these men.

*Medicolegal Instruction:* The department works in close co-operation with the North Carolina State Medical Examiner System. Special medicolegal investigation for others are undertaken from time to time. The department collaborates with other departments of the Schools of Medicine and Law in a course in legal medicine that is given in alternate years.

## *Pediatrics*

First-year medical students receive twenty hours instruction in normal growth and development and in patterns of behavior. There is a nine weeks course in pediatrics during the junior or senior year, the time being equally divided between clinic and ward services. Students participate in the morning subspecialty clinics, the well baby clinics and afternoon general medical pediatric clinics, seeing both new and return patients. Each week a one hours conference is held at the end of the following specialty clinics: hematology, metabolism, neurology, cardio-renal, allergy, convulsive disorders, behavior problems, endocrinology and well baby care. Each afternoon, there is a one hour conference in the general pediatric clinic with informal presentation and discussion of patients. On the wards, the students assist as clinical clerks and are assigned patients in rotation. They make daily rounds with the staff. Pediatric nursing procedures are demonstrated by the nursing supervisor. The different subspecialty groups—cardiology, hematology, allergy, endocrinology, dematology, metabolism—make ward rounds weekly. A joint conference with the senior and resident staff is held twice weekly on topics of pediatric interest, clinicopathologic discussions, case presentation and for guest lecturers. There is a weekly radiology conference at which the interesting cases of the week are presented and discussed with the radiologist. Each student prepares a paper on a pediatric subject of his own choosing which they present to the entire group in an informal discussion.

In addition to the ten pediatric first year residencies, there are four in which six months each are spent in obstetrics and pediatrics for graduates who plan to enter general practice. Six second-year, four third-year, and two chief residencies are available.

## *Physiology and Pharmacology*

The course in medical physiology is given during the first year. There are lectures, laboratories and conferences each week in which are presented the general principals of human physiology and their general application to the practice of medicine. The course consists of two parts. The intention of Part I is to identify that core of information about physiology which all medical students will need no matter which of the many careers in medicine and the medical sciences they may choose. Part II seeks to provide an opportunity for the medical students to explore in depth some facet of physiology.

The course in pharmacology is taught in the Spring of the second year. Lectures, laboratories and conferences deal with the mode of action of drugs in terms of biochemical and physiological processes.

*Physiologic and Pharmacologic Research.* The facilities of the department include modern types of research equipment. There are special facilities for research in the fields of respiration, high altitude physiology, circulation, endocrinology, cellular transport processes and metabolism, cellular neurophysiology, muscle physiology and molecular physiology. Properly qualified students are encouraged to undertake original research in physiology and pharmacology under direction of various members of the staff.

*Seminars.* Each fall term a seminar for graduate students in physiology is conducted by the staff.

*Courses in Advanced Physiology.* During the fall term, a series of two-hour lecture and seminar courses in certain aspects of advanced physiology are given for qualified students and post-doctoral fellows. These courses, noted below, are given in alternate years.

Topics in Pulmonary and Cardiovascular Physiology.
Cellular Endocrinology.
Physiology of Excitable Cells.
Cellular Transport Processes.
Molecular Physiology.

*Training in the Use of Radioactive Isotopes in Physiological Research.* The course in physiology for first year students will include considerable emphasis on the handling and experimental use of radioactive isotopes.

## *Preventive Medicine*

*Preventive Medicine.* In the second year there is a series of lectures given to provide some basic orientation predicated upon the fact that

disease has a community as well as a personal aspect and that the social component of illness is an important force in the work of the doctor as well as in the life of the community. The methods and goals of preventive medicine are illustrated and discussed in relation to specific diseases. The student is oriented in the methods of public health administration with particular emphasis on the role played by practicing physician. The problems involved in the collection of vital statistics and the methods of epidemiology are considered. Special attention is given to the factors involved in providing medical care to the community. The physician's role in legal and industrial medicine is also considered. The course is designed primarily to give the student a point of view which he may incorporate in his future activities in clinical medicine.

## *Psychiatry*

The objectives of the undergraduate teaching program in the Department of Psychiatry are: (a) to bring to the medical student the basic information which he requires to comprehend his role in the community as a physician, to understand his relationship with patients, to appreciate the impact of disease upon the patient, and to understand the influence of the psychic processes upon the behavior and physiological functioning of the patient; (b) to provide the student with the knowledge of interviewing techniques and psychotherapeutic skills which can be utilized in the general practice of medicine.

Instruction begins in the first year. Approximately 76 hours are devoted to personality development, maturing and aging, and the effect of the environment upon the individual. Teaching methods include lectures, the clinical demonstration of normal children, adults and patients, and small group discussions. During the second year, psychiatric concepts are presented which consider in some detail the topography of the mind, the common mental mechanisms, the concept of the unconscious, and the effects of these various factors on disease. Interviewing techniques are given considerable attention, and the student is given his first opportunity to observe and work with patients. In the third year, the student is assigned for a nine-week period to the Inpatient Service and to the Psychosomatic Service of the Department of Psychiatry. During this time, he has an opportunity to come in contact with patients who have a wide variety of emotional disorders. Emphasis is placed upon recognition and treatment of mental disturbances and the proper referral of seriously disturbed patients. During the senior year, the student, under close supervision, conducts psychotherapeutic interviews and observes the

psychotherapeutic efforts of a senior psychiatrist. One afternoon a week is allotted throughout the year for this purpose.

Specialty training in the field of Psychiatry is offered professionally qualified physicians who have completed at least one year of internship. Completion of such training meets the requirements of the American Board of Psychiatry and Neurology. The major areas of residency training are the Psychiatric Inpatient Service, the Adult Outpatient Clinic, Psychosomatic Medicine, and the Durham Child Guidance Clinic.

## *Radiology*

Radiology teaching starts in the first year. During the course in anatomy, x-ray lectures are given. Radiologic discussions are presented to section groups. In the second year, student groups get further sectional training. An attempt is made to acquaint the student with the aids of roentgenology in diagnostic problems. The correct use of x-ray in diagnosis is stressed.

In 1960 the Radiation Therapy Wing was completed. This is a 16 room addition to the Department of Radiology and houses the entire radiation therapy, cancer teaching and cancer portion of the department. There are two supervoltage rooms; one with 3600 curie Cobalt 60 machine, the other with a Cesium 137 unit for head and neck, mouth and lip cancer. There is a 280 kilovolt conventional x-ray therapy machine. There is a superficial therapy x-ray machine. The radium unit is complete with housing facilities and working area for 1000 miligrams of radium or $Co_{60}$ equivalent. In addition to examining rooms and viewing rooms there is one large lecture hall in which tumor clinics and student conferences are held.

Therapeutic radiology is given each quarter in the senior year. Tumor clinics run throughout the year. At these sessions the general problem of the treatment of benign, inflammatory and malignant lesions by x-ray and radium is discussed, and accepted views of the combination of these therapeutic agents with surgery are emphasized. Representative cases are demonstrated, and the follow-up results are particularly stressed. The tumor clinic is active in all specialties.

A limited number of senior students are permitted to attend routine film reading sessions in the Department of Radiology. They are also instructed in the fundamentals of fluoroscopic examinations and shown the many pitfalls of the inexperienced fluoroscopist.

X-ray conferences are scheduled with each specialty in the X-ray Conference room with weekly schedules. All x-ray cases on the service of the preceding week are shown and briefly discussed for benefit of the house staff and attending students. Weekly conferences,

including the Ear, Nose and Throat, Orthopaedics, Neurosurgery, Thoracic surgery, Pediatrics, Cardiac, Gastro-intestinal, Urology, are held and used as part of the teaching program. Wednesday and Friday afternoons special x-ray conferences of x-ray pathology are held. X-ray pathology conference 5 to 6 P.M. each Wednesday afternoon in the autopsy room.

Each Wednesday evening a conference is held by the members of the x-ray staff and visiting radiologists. Difficult cases are brought up for discussion and diagnosis.

A regional x-ray conference is held the last Thursday in each month, alternating with the University of North Carolina.

### RADIOISOTOPE DIVISION

The Radioisotope Division of the department operates a clinical radioisotope laboratory which serves the medical staff with diagnostic and therapeutic procedures done with radioisotopes and labeled compounds. At the present time a total of 35 procedures are available; 23 quantitatvie tracer tests, 7 scanning techniques and 5 therapeutic procedures. They are listed in a laboratory manual. Their number is continuously growing. In addition there are several major research projects actively under investigation. They cover studies of regional flow and distribution of blood, of renal function, of gastrointestinal absorption, of effects of chemotherapeutic agents, cellular physiology and radiation biology, and dosimetry of systemic internal radiation by whole body counting and scanning. The teaching program of the division includes post graduate training of resident physicians in medical uses of radioisotopes which is obligatory for residents in Radiology, elective for residents in other specialities (three months in service training). In addition accelerated courses for outside physicians interested in obtaining AEC licenses for the diagnostic use of radioisotopes are given. Medical students are taught the medical applications of radioisotopes techniques on an elective basis. The board certified training of technicians is described in the chapter entitled "Radioisotope Technology."

## *Surgery*

*General Surgery.* In the *second* year, the students attend lectures and demonstrations in surgical physical diagnosis which are integrated with the over-all course in Physical Diagnosis. They also have the opportunity to examine patients with surgical diseases under the supervision of a surgical instructor. In another phase of the second year surgical program, a four week course is given in "Emergency Surgery" under the auspices of the MEND program. Various aspects

of traumatic surgery and simple life saving procedures are taught to each individual student on experimental animals under conditions closely simulating those in human surgery. The course includes a one day visit to Fort Bragg for a demonstration of the management of mass casualties. A two week course in radiation biology given by the Department of Radiology is integrated with the surgical program. The *junior* students, during their surgical quarter, are assigned to the wards as clinical clerks in general and thoracic surgery, plastic surgery and neurosurgery. During one half of the quarter, they are assigned to the wards at the V.A. Hospital. The students usually assist in the operative treatment of their patients. The surgical students in the *senior* year are assigned to all Surgical Clinics and, in addition, serve as clinical clerks working on the wards in Orthopaedics, Urology, Otolaryngology and Ophthalmology. In groups of two for the proportionate time available they are assigned in rotation to the operating room for Anesthesia and to the emergency division of the Out-Patient Clinic for experience in the diagnosis and care of urgent conditions.

*Anesthesiology Division.* Second year students are instructed in the fundamentals of anesthesia during operative procedures on animals. They also are given a practical demonstration of anesthetic drugs and techniques during the course in pharmacology. Third year students are given a series of lectures stressing cardiac arrest and resuscitation, oxygen therapy techniques and treatment of the patient in shock. Senior year students are given a ten day concentrated course of training in the practical administration of anesthetics, during which time they observe and administer anesthetics under the supervision of staff anesthesiologists.

*Neurosurgical Division.* During all four quarters, separate weekly ward rounds are held for the junior and senior surgical groups. Emphasis in these rounds is placed upon the recognition of neurosurgical problems, followed by observavtion of the operative and post-operative procedures. Weekly x-ray and pathological conferences are held, and these may be attended by interested individuals. Tumor clinic conferences are held bi-monthly, on each second and third Thursday of the month.

*Ophthalmologic Division.* Second-year students as a part of the course in physical diagnosis are instructed in the use and application of the ophthalmoscope, perimeter, and other diagnostic instruments commonly used in Ophthalmology. Fourth-year students are assigned for one week (39 hours) to the ophthalmic division where opportunity is provided for instruction in ophthalmic disease, in the treatment of ophthalmic emergencies, and in recognition of ophthalmic signs useful in the over-all evaluation of the patient in relation to systematic disease. Fourth-year students attend weekly rounds in medical oph-

thalmoscopy and neuro-ophthalmology during the surgical assignment. An elective is offered during the free period for students interested in ophthalmology.

*Orthopaedic Division.* During the surgical quarters the junior and senior students attend weekly rounds in orthopaedics and fractures. Students in their senior surgical quarter are assigned in rotation to the orthopaedic clinics. These students also attend all orthopaedic staff rounds, assist in orthopaedic operating rooms and attend the Journal Club meeting and all basic science lectures for the graduate students. An elective course in the treatment of fractures, limited to three students, is offered during the junior and senior surgical quarters. Also elective courses are offered in physical therapy and in cerebral palsy during these quarters. Children's orthopaedic scholarships for work at the North Carolina Orthopaedic Hospital are available during any quarter of the clinical years as are United Cerebral Palsy Scholarships at the North Carolina Cerebral Palsy Hospital. Arrangements may be made for the students who so desire to do research or experimental work. The students may also attend the state orthopaedic clinics.

*Otolaryngologic Division.* An introductory course of five hours' instruction in the use of otolaryngological instruments, with a review of normal anatomy, is given to second year students. Senior students in the surgical quarter are assigned for two weeks to the service, during which time they devote their duties to out-patient, ward work —both public and private, operating room and are available for all ward rounds. Nine hours of didactic lectures are given in the surgical quarter. A hearing-speech clinic has been initiated. Evaluation of hearing is being done with specialized equipment in sound-treated-rooms. Time-consuming hearing tests, such as galvanic skin response, are done by special appointments.

*Physical Medicine and Rehabilitation Division:* First year student teaching consists of general orientation and combined lectures in functional anatomy. During the second year students are introduced to the use of electromyography and other electrodiagnostic tests in addition to physical diagnosis primarily of the musculo-skeletal system. Supplementary lectures covering a broad area are given during the third year in those divisions and departments with whom Physical Medicine and Rehabilitation closely cooperates. Third year students assigned to the Department of Surgery, Durham V.A. Hospital, receive didactic lectures weekly. An elective course is offered during the fourth year when students are familiarized with public and private resources and will work closely with paramedical personnel in the over-all therapy and discharge planning of severely disabled patients. Students are encouraged to attend the Rehabilitation Evaluation

Clinic which meets twice monthly. Summer traineeship grants are available for interested students who have completed their second year of medical education.

*Plastic, Maxillofacial and Oral Surgery Division.* Didactic lectures and patient demonstrations are given to both the third and fourth year students to familiarize them with the basic principles of wound healing and repair, plastic, reconstructive and reparative procedures. Beside ward rounds, demonstrations are held twice weekly to illustrate the phenomena of trauma, disease and reconstruction. Third year students are assigned plastic surgery cases and patients and follow them from admission to the operating room and through convalescence until discharge from the hospital. Fourth year students work in the plastic surgery clinic which meets each afternoon, Monday through Friday, with special reference to Wednesday which is the plastic surgery and oncology return or follow-up day. Opportunity is afforded interested students to observe moulage, cast work, cosmetic restoration of color and the making of prosthetic appliances, etc. Associated closely and allied with the Division of Plastic Surgery are Oral Surgery, Medical Speech Pathology, and Orthodontics. Oral Surgery conducts ward and teaching rounds of particular interest to the junior students at Duke Hospital and at the V.A. Hospital. The Oral Surgery Clinic is in operation five and one-half days a week, and consultations and pre-and post-operative care of patients are conducted daily. Medical Speech Pathology will work in close cooperation with the Divisions of Plastic and Oral Surgery, Otolaryngology, Neurosurgery, Neurology, and Orthodontics, and the Departments of Pediatrics, Psychiatry and Medicine. Lectures are given to familiarize students with the various types of speech defects and abnormalities which are encountered in both children and adults. Pre- and post-operative cleft palate patients are seen and evaluated each Wednesday afternoon in conjunction with the plastic surgical clinic. A speech and hearing clinic is conducted each Tuesday in which children with speech and/or hearing defects are evaluated by a diagnostic team consisting of the pediatrician, otologist and speech pathologist. Clinics will be arranged as desired with other departments. Speech and hearing evaluation and speech and hearing therapy are given daily by appointment. Orthodontics attempts to cooperate with other divisions and departments in the Duke Medical Center for the treatment of dental malocclusions, acquired and congenital anomalies of the face and oral structures as well as the nasal and pharyngeal structures. Lectures are available to familiarize members in allied specialties and students with the growth and development processes of the head and face, general recognition of developing oral and facial defects, developing oral habits and the importance of

preventing caries of the teeth and retention of teeth for the general health of the individual.

*Thoracic Surgical Division:* During the junior quarter, weekly rounds are held with particular attention paid to the relationship to preclinical sciences of the altered pulmonary, gastro-intestinal, and cardiovascular function as demonstrated by the patients. One hour each week a special x-ray conference conducted by one of the Professors of Radiology is held for the benefit of the student. Each patient on the service is discussed, his x-rays shown, and alterations in the radiologic picture by the particular disorder are discussed by the radiologist and members of the thoracic surgical staff. There is an additional conference one hour per week where the diagnosis, treatment and complications of each thoracic patient is discussed. During the senior quarter, a one hour lecture per week is held for the seniors, and during this period particular emphasis is placed on the diagnostic aspect of thoracic and cardiovascular disease. There is a follow-up thoracic and cardiovascular surgical clinic each Wednesday morning and the senior students participate in this follow-up.

*Urologic Division.* In the second year, the medical students are given a course in physical diagnosis which includes one demonstration of urologic examination in the normal individual. In the fourth year, ward rounds and lectures are given by the upper staff every Thursday afternoon and Saturday morning for students in their surgical quarter. Small groups are selected from the senior surgical group and assigned in rotation to the urologic department for concentrated study for a two weeks' period. These students spend all of their time with the urologic hospital patients and out-patients in the Urology Clinic under supervision of the resident and upper urologic staff. They work up the hospital patients on the ward, attending to all the diagnostic procedures with the help of the resident staff when necessary. They are encouraged to act as assistants in the surgery on their patients. They are invited to attend all Urologic Rounds, Staff Conferences and Journal Club Meetings. Students are assigned to urology work with the upper staff in consultation and also the resident staff in taking care of the urologic patients in the out-patient clinic every afternoon. Following this, ward rounds and x-ray conferences are held every day by the resident staff and the students are encouraged to attend these sessions. As in evident, there is the closest association and constant supervision of these students by both the upper and resident staff during their assignment to the urology division. Students are also urged to work on a research problem and to the services of the urologic research laboratory is made available to them for this study.

# *Veterinary Medicine*

The function of this Department is to facilitate the various teaching and research programs that require laboratory animals. Veterinary medical consultation is provided for research projects in which experiments are conducted on animals. Assistance is made available in selecting the most suitable species or strain of laboratory animal to use in a given study. In addition, animals are procured, quarantined and appropriately conditioned in order to provide a highly reliable biological tool. A wide variety of technical services are carried on, such as providing whole blood of a variety of species, collecting biological specimens, providing clinical pathologic examinations, preparing animals for surgery, post-surgical care, and maintenance of the animal colonies.

The department collaborates with those departments of the School of Medicine that utilize laboratory animals in their teaching programs. Various disease states are experimentally produced in animals for student observation and study and techniques for collecting of biological specimens for additional study are demonstrated. Aid is given in setting up and carrying out these demonstrations and studies on animals.

A post-doctoral training program in laboratory animal medicine has been initiated and plans are under way to increase the number of available training positions.

Although the department is in an early stage of development, some research is under way on some of the spontaneous diseases of laboratory animals.

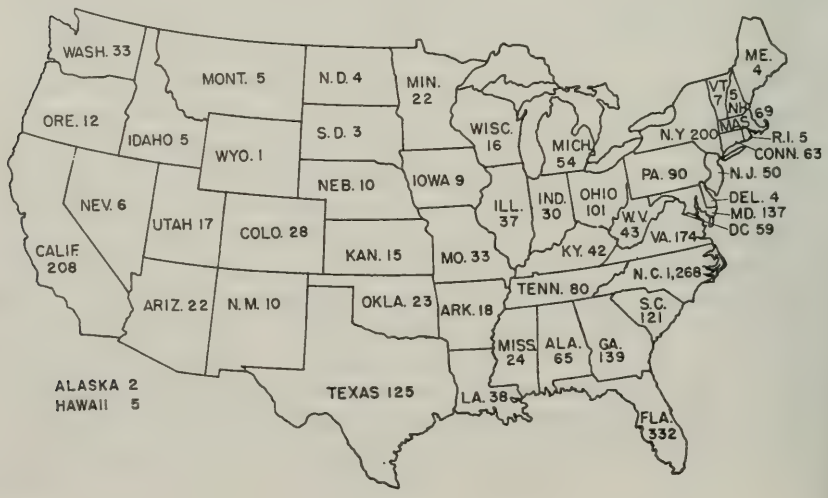
# Organizations

## *Duke University Medical Alumni*

The Duke University Medical Alumni now number over four thousand, one hundred. Membership includes all graduates of the medical school (total through 1963—2,169), past and present faculty, all past and present house-officers of Duke Hospital (including the 1,958 who are not Duke graduates); making a grand total of 4,127. Associate membership is held by alumni of the following Paramedical Services: Hospital Administration, Dietetics, Social Service, Laboratory Technique, X-Ray Technology, Physical and Occupational Therapy, Medical Record Library, and Medical Art and Illustration.

Larry Turner '39, President (Durham, N. C.)
K. D. Weeks '39, Vice-President (Rocky Mount, N. C.)
George J. Baylin '37, Treasurer (Duke University Medical Center)
Talmage L. Peele '34, Secretary (Duke University Medical Center)
Roger L. Marshall, Director of Alumni Affairs (Duke University)
William B. Jennings, Jr., Assistant to the Director of Alumni Affairs (Duke University)

A newsletter is sent to all the members in January, April, July and October of each year. Reunions are held every three years in



Durham, the next is planned for 1964. Alumni groups have been formed in several states.

Alumni luncheons or dinners are held during the following meetings: The American Medical Association, The Southern Medical Association, The North Carolina Medical Society, and The American Academy of Pediatrics.

The map shows states in which Duke Medical Alumni are located and the number in each state. Figures include those who received the M.D. degree from Duke and those who have served a year or more on the house staff.

Not shown are the 198 physicians serving in territories of the U.S. and in foreign countries* and 56 on duty in the Armed Forces overseas. A total of 3,873 physicians are distributed among all the United States.

## *Student Government Association*

In every field of endeavor there should be certain guidelines for acceptable conduct. The future doctor is fortunate in that his path was inscribed for him many centuries ago by a great physician and philosopher, Hippocrates. Every graduate of a recognized medical school has sworn to uphold Hippocrates' vows. But before he is permitted to swear this oath he must undertake the long and arduous course which leads to the M.D. degree. Here, mere intellectual achievement is not sufficient: the student must develop character and judgment worthy of this noble profession. As in every society, the individual must comport himself in a manner which does not bring disgrace upon himself or his school. An honor system should be as general as this. At Duke, any person who fails in this respect must answer for his actions to the Honor Council and the administration.

The Student Government Association is composed of 16 elected members of the student body: three officers, three representatives from each class, and the President of SAMA or his appointee. This group accepts the responsibility for the review of disciplinary matters brought to its attention through its role as Honor Council. All students entering the school are required to comply with this system of government.

Other responsibilities of the SGA include the initiation of the

* Afghanistan, one; Australia, two; Belgium, three; Brazil, seven; Canada, twenty-eight; Chile, eight; China, one; Colombia, ten; Cuba, four; Denmark, one; Egypt, one; Formosa, nine; France, three; Germany, three; Greece, one; Guatemala, five; Iceland, three; India, five; Iran, three; Iraq, one; Ireland, one; Italy, one; Jamaica, B.W.I., one; Japan, eighteen; Jordan two; Kenya, one; Korea, four; Lebanon, one; Malaya, one; Mexico, seven; Nigeria, one; Norway, two; Panama, four; Paraguay, one; Peru, two; Philippine Island, six; Puerto Rico Rico, three; Rhodesia, one; Scotland, one; South Africa, two; Sweden, three; Switzerland, two; Thailand, six; United Kingdom, twenty-two; Venezuela, five; Virgin Islands, one.

freshman advisory council, publication of the school yearbook, the Davison Scholar program, and social events. The group also serves as the court of appeals for traffic violations.

## *The Duke Sama Chapter*

Representing 75% of the medical student body, the Duke Chapter of the Student American Medical Association is a service organization interested in a wide spectrum of activities. SAMA is the only international organization which represents the opinions and desires of the future physicians of America.

Chartered only recently, the organization has earned a reputation for its interest in medical recruitment in conjunction with the admissions committee, a summer externship program, a directory of the medical center, a listing of research opportunities for medical students and many other service projects. Recently SAMA has joined the International Federation of Student Medical Associations; this union promises to provide a means to increase the opportunities for study outside the United States. The Duke Chapter has been very active in the national organization.

# Duke Hospital

## *Internship and Residencies*

Straight internships of one year duration are available in Medicine, Surgery, Pathology and Pediatrics, and two mixed internships are offered in Obstetrics and Pediatrics. Appointments are from July 1 through June 30 with few exceptions. Interns receive a stipend of $150.00 per month, with uniforms and laundry of uniforms provided.

The Residencies offered, with the Chairman of each service, are as follows:

| | |
|---|---|
| Anesthesiology | C. Ronald Stephen, M.D. |
| Internal Medicine | (Chm.) Eugene A. Stead, Jr., M.D. |
| Dermatology | J. Lamar Callaway, M.D. |
| Neurology | Albert Heyman, M.D. |
| Obstetrics & Gynecology | (Chm.) Bayard Carter, M.D. |
| Pathology | (Chm.) Thomas D. Kinney, M.D. |
| Pediatrics | (Chm.) Jerome S. Harris, M.D. |
| Psychiatry | (Chm.) Ewald W. Busse, M.D. |
| Radiology | (Chm.) Robert J. Reeves, M.D. |
| Surgery—General | (Chm.) Clarence E. Gardner, M.D. |
| Neurological Surgery | Guy L. Odom, M.D. |
| Ophthalmology | W. Banks Anderson, Sr., M.D. |
| Oral Surgery | Nicholas G. Georgiade, M.D. |
| Orthopaedic Surgery | Lenox B. Baker, M.D. |
| Otolaryngology | William R. Hudson, M.D. |
| Plastic Surgery | Kenneth L. Pickrell, M.D. |
| Thoracic Surgery | W. C. Sealy, M.D. |
| Urology | James F. Glenn, M.D. |

Application forms and information for internships, residencies or available fellowships may be obtained by writing to the Chairman of Department, Duke University Medical Center, Durham, North Carolina. Both men and women graduates of any Class A Medical School are eligible for appointment. While internships are rarely available to graduates of medical schools outside the United States and Canada, a limited number of residencies and research fellowships are available from time to time in which case certification by E. C. F. M. G. (Educational Council on Foreign Medical Graduates, 1710 Orrington Avenue, Evanston, Illinois) is prerequisite.

Duke University Medical Center is a participating member of the National Intern Matching Program, 2530 North Ridge Avenue, Evanston, Illinois, and all applicants must register with this program. The Hospital is a member of the American Hospital Association, is approved by the American Medical Association for internship and

residency training, and is fully approved by the Joint Commission on Accreditation of Hospitals.

The Duke University Medical Center is an integral part of Duke University which makes its educational, recreational and athletic facilities available for the Resident Staff.

The Durham Veteran's Administration Hospital adjoins the Duke University Campus, and is operated under the supervision of the Dean's Committee of the Duke University School of Medicine. The full time professional staff of the Veteran's Hospital are all members of the School of Medicine faculty. All training programs are integrated with corresponding programs at Duke University Medical Center, which includes rotating of House Officers to each hospital from time to time.

## *Postgraduate Study*

Graduates in medicine are welcomed at the various specialty clinics in Medicine, Surgery, Obstetrics, and other specialties from 9:30 A.M. to 12:30 P.M. each morning except Sunday.

Ward rounds are given in Medicine in the mornings as general Out-Patient Clinics are in session in the afternoon. Throughout the entire year there are concentrated formal types of Postgraduate instruction in the way of Symposia and study groups. These include subjects for the generalist as well as for the various specialties. Announcements concerning these Symposia will be made from time to time.

# Paramedical Courses at Duke Medical Center

Graduate education for hospital administration is offered through a 24-month program conducted jointly by the Graduate School of Arts and Sciences and the Medical Center. The Program consists of selected graduate courses in Economics, Political Science, Sociology, and Hospital Administration, and of a 12-month administrative residency in hospitals and other health agencies. The Master of Hospital Administration degree is awarded to those who successfully complete the Program.

Detailed information my be obtained from:

Program in Hospital Administration
Duke University Medical Center
Durham, North Carolina

## *Medical Art and Illustration*

The function of this Division is to produce visual aids by means of various art and photographic methods for staff members allied to medicine. These visual aids are used to enhance the medical records and to aid in research and education. Services offered by this Division are: 1. Medical Art: Illustrations, by means of various artistic techniques, depicting anything perceptible to the eye, the existing but unseen and even the theoretic, as well as mechanical drawings, diagrams, charts, graphs, lettering, casts, models, exhibits, etc. 2. Medical Photography: Illustrations of anything to which available photographic equipment will respond. This division produces still and motion pictures, microphotographs, pictures of the retinae, photographic copies, film strips, lantern slides, enlargements and contact prints. Services offered directly for the patient's benefit are: Production of various types of anatomical prostheses and instruction in the use of opaque cosmetics. Facilities for individual training in specific techniques or methods employed by this division are available. No academic credit is given. Prerequisites, tuition, time and type of training are determined by the Chairman of this division. No regular courses of instruction in medical art and photography or their allied fields are offered.

## *Nurse Anesthesia*

The eighteen months course in anesthesia is available to well qualified registered nurses. Instruction embraces the theoretical aspect and clinical application of all drugs and techniques in accepted usage. The program is divided into quarters. The major part of the basic theoretical instruction is given during the first three quarters. After a preclinical period of eight weeks, clinical practice runs parallel with the theoretical program. One class is accepted annually and enrolled January 15. All appointments of the current year are made by Steptember 1 of the preceding year. Graduates of this course are eligible to take the qualifying examination for membership in the American Association of Nurse Anesthetists. Tuition is $150.00. Additional information concerning nurse anesthesia may be obtained from Mary B. Campbell, C.R.N.A., P.O. Box 3204, Duke University Medical Center, Durham, North Carolina.

## *Nursing*

*Practical Nursing Division of the Vocational Education Department of the Durham City Schools, Duke Unit.* After four months of classroom instruction at the Durham Industrial Education Center eight months are spent in classes and practical training at Duke Hospital. At the completion of this course the student receives a certificate in practical nursing and is eligible for licensure as a practical nurse in North Carolina.

## *Physical Therapy*

The Curriculum in Physical Therapy at Duke University is conducted under the joint auspices of the Graduate School of Arts and Sciences and the Medical Center.

Two programs are offered:

1. The Program leading to a Certificate in Physical Therapy and a Master of Arts Degree. This is in two phases:

a. In the first year the necessary credit courses may be selected from the following: Anatomy M201, 6 units; M202, 3 units; M203, 4 units; M205, 2 units; M313-314, 2 units; Physiology M261-262, 8 units; Phychology S232, 3 units; M279, 1 unit; M370, 2 units; M372, 3 units; Biochemistry 201, 3 units; Zoology 252, 4 units; 245, 3 or 4 units; 271, 4 units.

b. In the second year in addition to the thesis, the physical therapy procedure courses listed in program two and practicum may be completed.

Upon completion of the total two year program a Certificate in Physical Therapy and a Master of Arts Degree are awarded.

2. The Certificate Program.

A baccalaureate degree or a plan for receiving such a degree from the preparatory college upon completion of the physical therapy program is essential for admission.

The program includes basic science courses from those listed in program one in addition to courses in kinesiology, pathology, physical therapy and rehabilitation as related to the medical and surgical specialties, administration, ethics and physical therapy procedure courses. Sixteen weeks of clinical experience are provided on a rotation basis at Duke University Medical Center, affiliated hospitals, and state and county health departments.

The entire curriculum including the practicum may be completed in fifteen months.

Prerequisites for both programs are basic courses in psychology, mathematics through trigonometry, and one year laboratory courses in chemistry, a biological science exclusive of botany, and physics covering the principles of heat, mechanics and electricity. In addition, those undertaking the Master of Arts Program must meet the requirements of their selected major.

Tuition and health fees are $1,200 for the fifteen month's certificate program. For the program leading to a Master of Arts degree the cost is approximately $1,800. Scholarship and loan funds are available.

Graduates of either program are eligible for state and national licensing and registration examinations and membership in the American Physical Therapy Association.

For further information write to the Director of Physical Therapy, Box 3247, Duke University Medical Center, Durham, North Carolina.

## *Prosthetic and Orthopaedic Appliances*

The function of this department is to produce prosthesis and orthopaedic applicances for the medical profession. Facilities for individual training in specific techniques or methods employed by this department are available. Those who complete four years' training are eligible to take the examination of American Board of Certification.

## *Radioisotope Technology*

The Radioisotope Division offers a three month training program of instruction and laboratory training for clinical radioisotope tech-

nicians, and a six month training program of instruction and laboratory training for research radioisotope technicians. This training includes work in all areas of the Radioisotope Division.

An applicant for admission must be a graduate of an approved high school and board certified (or eligible to take board examinations) in Medical Technology or X-ray Technology. Equivalent training and experience may be substituted for this requirement.

A registration fee of $100 is required. This fee includes tuition, and diploma fee for the course.

For further information address inquiries to: Mrs. Kathryn W. Sharpe, Instructor in Radiology (Radioisotope Division), Box 3166, Duke University Medical Center, Durham, North Carolina.

## *X-Ray Technology*

The School of X-ray Technology offers a two year training program of instruction and practical training in all divisions of the Department of Radiology.

Students are admitted the first Wednesday in September for two years of intensive training in the academic and practical aspects of radiographic therapeutic and radioisotope technique.

During the second year the students are paid a stipend of $100.00 per month. Upon completion of the course, the students are required to take the National Board Examinations in X-Ray Technology sponsored by the American Registry of X-Ray Technicians. The school is approved by the Council on Medical Education of The American Medical Association.

Candidates for admission must be graduates of approved high schools and rank in the upper third of their class. Candidates with college credits are given preference. Official transcripts of high school and/or college grades, a list of three references and a recent photograph must be included with the application before being considered by the Committee on Admissions. It is recommended that applicants be at least 20 years and not more than 30 years of age at the time of enrollment.

A registration fee of $25.00 is required upon the entrance and is payable to the Treasurer, Duke University, on the day of entrance. Books, supplies and uniforms are about $100.00. White uniforms and white shoes are required. Laundry of uniforms is furnished by the Medical Center. No living quarters are provided for paramedical students by the University and the students in X-Ray Technology live in town at their own expense. For further information or application blanks write John B. Cahoon, R.T., Technical Director, School of X-Ray Technology, Duke University Medical Center, Durham, North Carolina.

# THE SCHOOL OF NURSING

Fall semester begins September 24, 1964

Spring semester begins February 4, 1965

# General Information

The School of Nursing functions within the philosophy of Duke University. This philosophy is epitomized by its motto, *Eruditio et Religio,* which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities."

The faculty of the School of Nursing ascribes to the concept that a professional nurse is a person who has acquired the specialized knowledge of Nursing, who has attained abilities useful in practice of Nursing, and who has developed attitudes appropriate to the profession of Nursing.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of the students through experiences planned for the acquisition of specific knowledges which include: knowledge of scientific principles basic to Nursing, and knowledge of the tools, techniques, and resources useful in the practice of Nursing, and knowledge of characteristics of the Health and Welfare Institutions.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of the students through experiences planned for the attainment of skills which include: the ability to make decisions independently or as group participants, the ability to relate separate phases of patient care to a total plan of patient care, the ability to observe specifics, and to interpret observations for self and others; the ability to work harmoniously and positively with people in ramified and complex situations and organizations.

The faculty of the School of Nursing endeavors to promote a continuous change in the behavior of students through experiences planned for the development of desirable attitudes which include: a concern for personal enrichment, an appreciation of and respect for individuality, an awareness of their role as citizens, for contributing to their own development and to that of their community and profession.

## *History*

The School of Nursing of Duke University was established in association with the School of Medicine and Duke Hospital. The first class of students was admitted in January 1931. In 1953, the School of Nursing was incorporated into the Division of Health Affairs in the University structure. When established, the three year curriculum leading to the Diploma in Nursing was planned to prepare young women to meet community nursing needs; students who completed two years of acceptable college work were awarded a Bachelor of Science degree in Nursing in addition to the Diploma in Nursing. Trends in nursing created a demand for a four year program leading to the degree of Bachelor of Science in Nursing, and in 1953, the University Board of Trustees approved such a program. The Master of Science in Nursing degree was authorized in 1956.

Graduates of Duke University School of Nursing have served their communities in North Carolina and in other states; they have participated in their professional organizations on a national, state and local level. During World War II graduates of this school staffed the 65th General Hospital, the Duke University Medical Unit.

## *Relationship to the University*

As a part of the University community, the School of Nursing serves its students as the focus of a total educational experience that only a major university can provide. It shares the same campus with Trinity College, College of Engineering, the Graduate School of Arts and Sciences, the Divinity School and the Schools of Law, Medicine and Forestry, and Duke Medical Center. The facilities for library, laboratory and field work and the many activities—religious, intellectual, cultural and athletic—form part of the environment which contributes to the development of students in nursing. Thus, the student in nursing may enjoy simultaneously the broad facilities and challenges of a University and the life and atmosphere of a professional school.

## *Membership and Accreditation*

Duke University, which incorporates the School of Nursing with all of the other schools of the University, is a member of the Association of American Colleges and is accredited by the Southern Association of Colleges and Secondary Schools.

The generic program leading to the degree Bachelor of Science in Nursing is accredited by the National League for Nursing and the

North Carolina Board of Nurse Registration and Nursing Education.

The School is a member of the Department of Baccalaureate and Higher Degree Programs of the National League for Nursing.

## *Facilities*

The facilities for instruction include the facilities available in the undergraduate, professional, and graduate schools and colleges of Duke University and the clinical facilities of Duke Hospital, the North Carolina Cerebral Palsy Hospital and the Durham Health Department.

In a wing of Hanes House are located the administrative offices of the School of Nursing, a large classroom seating 100 persons and equipped with audio-visual aids; a small classroom seating 50 persons and equipped with a screen and movie projector, a nursing arts laboratory with equipment for nursing practice for sixteen students, and conference room.

A reference library of 6,000 books and periodicals of special interest to students majoring in nursing is located in Hanes House. Students use the general and professional libraries of the University.

Duke Hospital, an integral part of the Medical Center, is a 627-bed, 30 bassinet general hospital which performs the concurrent functions of patient care and professional education. It admits over 20,000 patients a year, and maintains comprehensive diagnostic and treatment facilities for their care.

Different levels of patient care are provided by a minimal care unit and intensive care facilities in addition to conventional nursing units. Private, semi-private, and ward accommodations are available. Approximate daily patient census by service is as follows: Surgery (including Urology, Otolaryngology, Ophthalmology, and Orthopaedics), 230; Medicine (including Dermatology and Neurology), 150; Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include 18 operating rooms and a recovery room; over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained.

Outpatient services include a public clinic which totals some 121,000 visits a year, a private diagnostic clinic of comparable size and an active emergency service. All of the hospital components are located within a single building. Close working relationships between Duke Hospital and outside health agencies contribute to continued care.

Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association, and conducts an active educational program involving some 280 house staff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

## *The Summer Session*

The programs in the School of Nursing include courses in the Summer Session each year. Students in the School of Nursing have their courses approved in the School of Nursing and pre-register with the Summer Session office. Students from other colleges and universities who are admitted to the School of Nursing with advanced standing may be required to enroll in the Summer Session to make up deficiencies. Arrangements for registration are made through the office of the Dean of the School of Nursing.

The Summer Session of 1964 will include two terms: Term I, June 9 to July 15; Term II, July 17 to August 21. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program both athletic and social.

University fees for Summer Session 1964 will be charged at the rate of $35.00 per semester hour for those admitted with advanced standing. Board for resident students is charged at the rate of $75.00 for each term of Summer Session, room is $46.50 per person for a term of Summer Session. The cost of laundry is approximately $0.50 per week. A bill is sent to all pre-registered students to permit payment in advance.

## *Student Government Association*

The purpose of this organization is to regulate all matters pertaining to the life of the undergraduate women of Duke University School of Nursing not under the jurisdiction of the faculty; to increase a sense of individual responsibility; and to cooperate with the faculty in creating and maintaining high ideals for the Duke University School of Nursing. Each student is a member of this Association from the time of her entrance into the School of Nursing until her graduation. An Executive Council, consisting of fifteen elected members, coordinates the affairs of this Association, but the student body as a whole is responsible for all legislative action.

THE HONOR SYSTEM: The purpose of the Honor System is to secure the cooperation of the undergraduate student body in maintaining honorable conduct in all relations of student, professional and social life. It applies to every undergraduate student in the School of Nursing. The Honor System is a vital directive force in all phases

of each student's life and is a major working part of the Student Government Association.

## *Santa Filomena*

SANTA FILOMENA is the Senior honorary society of Duke University School of Nursing. Its purpose is to recognize achievement and promote leadership. New members are publicly tapped at the May meeting of SGA. They are selected from the rising Senior class, and must fulfill the following three requirements:

1. Maintain a superior average throughout their first two years.
2. Demonstrate superior nursing ability.
3. Make some contribution to the betterment of the School of Nursing.

Santa Filomena strives to serve the nursing profession. Because all proceedings and ceremonies except tapping are secret, it may serve nursing in ways that other organizations cannot.

Santa Filomena's color is white; its flower, a white carnation; its pin, a small gold Florence Nightingale lamp.

## *The North Carolina State Student Nurses Association*

As members of the Duke University School of Nursing, students are eligible for membership in the North Carolina State Student Nurses Association and the American Student Nurses Association.

# Undergraduate Program of Study

## *Admission Requirements*

NEW students are admitted for the academic year at the opening of school in the fall.

Candidates may qualify for admission as members of the freshman class or as students with advanced standing. Since the enrollment is limited, the Committee on Admissions selects students who, in its judgment, are best qualified to benefit from the educational advantages which the school offers. Selection is based on the academic record of the candidate, on test scores, and on satisfactory evidence of good character and general fitness for college life at Duke. A visit to the campus for a personal interview with members of the faculty is of material benefit to the candidate and to the Committee.

ADMISSION TO THE FRESHMAN CLASS: A candidate for admission to the freshman class must present at least fifteen acceptable units of secondary school credit. A minimum of twelve units must be in college preparatory subjects, but it is recommended that fifteen be offered. Subjects classified as college preparatory are English, foreign language, history and social studies, mathematics (Algebra and Geometry), and sciences.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

EARLY DECISION PLAN: For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on October 15 of the student's senior year in secondary school. The deadline date for completing

applications for October decision is September 15. Interested students should write to the Office of Admissions for detailed information.

REGULAR ADMISSION: Candidates for regular admission must apply no later than March 1, and normally do so during the fall of the senior year. For this group, decisions are mailed by May 1.

Candidates for admission to the School of Nursing should address their inquiries to the Dean of the School of Nursing, Hanes House, Duke University, Durham, N. C., 27706.

A candidate for admission who wishes to arrange an interview should do so through the Office of Admissions of the School of Nursing.

## *Specific Requirements for Admission*

I. All applicants for admission to the School of Nursing must present at least fifteen acceptable units of secondary school credit. A unit of credit is allowed for a course of study pursued throughout an academic year at an accredited secondary school, if the course has been completed satisfactorily.

1. Twelve units must be in English, foreign language, history and social studies, mathematics, and natural science; and must include:
   (a) English—3 units.
   (b) Algebra—1 unit.
   (c) Plane geometry—1 unit.
   (d) Chemistry—1 unit.
2. The three remaining units are elective and may be selected from those subjects for which the school allows credit toward graduations; but they should also be selected from the five subject fields listed above.

Other units offered in subjects not included in this list will be considered for acceptance on the basis of full statements transmitted with the applicant's record from the school recommending her.

II. Applicants are advised to have their scores on the Scholastic Aptitude Tests and the scores on three achievement tests of the College Entrance Examination Board submitted to the office of Admissions of the School of Nursing.

III. All applicants must supply references from at least three persons, two of whom must be recent high school or college instructors.

IV. Interviews with members of the Duke University School of Nursing faculty are desirable and are encouraged.

V. Evidence of good health will be requested after the applicant is considered for acceptance. Final acceptance will be contingent on a

complete physical examination during the week of Orientation. This examination also includes a chest x-ray, blood and urine studies and skin tests.

## *Admission to Advanced Standing*

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions of the School of Nursing.

Applicants for advanced standing in the School of Nursing should present, as far as possible, subjects corresponding to those required by the School. They may not, during their first semester, register for more than the minimum number of hours required of the class which they enter, except by permission of the Dean of the School of Nursing.

Graduate nurses applying for admission to advanced standing are required to submit records of previous performance in Nursing, scores on the Scholastic Aptitude Tests and three Achievement Tests.

TRANSFER CREDITS. Transfer credit, in which grades of C or above have been earned, is rated at two quality points per semester hour. Courses in which grades of less than C have been earned are not acceptable for credit.

Although credit for work completed at other institutions will be determined in relation to the curriculum requirements of the School of Nursing, an overall average grade of C on all previous work taken is required before consideration for advanced standing may be given.

A student who transfers with advanced standing to the School of Nursing from a junior college must be enrolled for at least one semester before transfer of credit will be accepted. Credit for courses in science offered for advanced standing by a transfer from a junior college will be determined by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses. Any extension work accepted must be approved by the dean.

SPECIAL STUDENTS: Graduate nurses may be admitted for special work in such courses of instruction as their earlier training and experience may qualify them to take. They may not be admitted as candidates for a degree in the regular course of study unless they are able to meet all normal requirements for admission, which apply to all beginning students.

READMISSION OF FORMER STUDENTS: Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Duke University School of Nursing Office of Admissions with a detailed account of their activities since withdrawal from college.

# Financial Information and Living Accommodations for Undergraduate Students

FEES PAID by students cover only a part of the cost of their instruction and of the operation of the University. Income from endowment and contributions from the alumni, alumnae, and other public spirited men and women meet the balance, which constitutes more than half the total cost.

## *Estimated Expenses*

| | 1st year (2 sems) | 1st year (summer session) | 2nd year (12 mths.) | 3rd year (12 mths.) | 4th year (2 sems) |
|---|---|---|---|---|---|
| Tuition .....$ | 1050.00 | | $1050.00 | $1050.00 | $1050.00 |
| General Fee ..... | 187.00 | | 187.00 | 187.00 | 187.00 |
| Room Rent ..... | 285.00 | $46.50 | 395.00 | 395.00 | 285.00 |
| Board ..... | 450.00 | 75.00 | 600.00 | 600.00 | 450.00 |
| Laundry (approx.). | 20.00 | 3.00 | 25.00 | 25.00 | 20.00 |
| Books (approx.)... | 40.00 | 10.00 | 40.00 | 40.00 | 10.00 |
| Activities (Student Government) .... | 15.00 | | 15.00 | 15.00 | 15.00 |
| Uniforms (approx.) | 90.00 | | 10.00 | | 10.00 |
| Room Key Deposit. | 1.00 | | | | |
| Travel..... | | | | | 15.00 |
| Locker Rental .... | | | 1.00 | 1.00 | 1.00 |
| | $2138.00 | $134.50 | $2323.00 | $2313.00 | $2043.00 |

The tuition of $525.00 and the general fee of $93.50 are due and payable not later than the date of the beginning of a particular semester. No refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Beginning the third year, qualified students may secure additional supervised training by performing services during hospital assignments in patient care. Such students receive awards commensurate with service performed.

New students, on notification of acceptance, are required to pay a non-refundable matriculation fee of $20.00 and to make a deposit of $50.00. The $50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, $25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining $25.00 as a continuing registra-

tion deposit. Arrangements for refund for $25.00 room deposit are described in information furnished each resident student by the Housing Bureau. The $25.00 registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

Students who have been re-admitted to the University after an absence of one or more terms on notification of re-admission, are required to make the $50.00 room rent and registration deposit.

Undergraduate students are required to live in the School of Nursing residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for a period of not less than one semester. No refund of room rent will be made to a student who withdraws from the residence halls.

The dining facilities available to students in the School of Nursing include the Medical Center Hospital Cafeteria for upperclass students; the Men's Graduate Center Cafeteria and the East Campus Union for freshman and sophomore students. Resident students may not board at other than the places specified. The charge for board is payable in equal payments, not later than the date of the beginning of each semester and for freshmen, also at the beginning of summer session.

Students will not be entitled to a refund on board after the dates indicated below. For freshman and sophomore students, no refund on board will be made after the Fall or Spring mid-semester. For junior and senior students, no refund on board will be made after the fall clinical quarter or after the winter clinical quarter.

In the regular academic year, students who register for no more than two courses with a maximum credit of 8 semester hours are classified as special students. They are charged a registration fee of $5.00 for each course and $35.00 for each semester hour of course credit. Registration for 9 or more semester hours or 3 or more courses, requires payment of full fees.

Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than 8 semester hours may audit other courses by payment of $15.00 for each course audited. Auditors submit no daily work, take no examinations, and receive no credit for courses audited.

One transcript is issued free of charge. Additional copies are supplied at $1.00 each.

No records are released and no student is considered by the faculty

as a candidate for graduation until she has settled with the Treasurer for all indebtedness.

Bills may be sent to parents or guardians provided the Treasurer has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

## *Living Accommodations*

Hanes House and Hanes House Annex are residence houses for School of Nursing students. Freshman students are assigned to Hanes House Annex. A counselor and her assistants, who are members of the Dean's staff, live in the respective houses. The counselors, with the cooperation of the Student Government Executive Council, are responsible for the administration of the houses.

Undergraduate students are required to live in the residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for the academic or calendar year, but for a period of not less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

The rental charge for a single room is $335.00 for an academic year or $167.50 per semester or $465.00 per twelve month period. The rental charge for a double room is $570.00 for an academic year or $142.50 per person per semester, or $790.00 per twelve month period or $395.00 per person for twelve months period. The rental charge for a single room for a summer session term is $55.50; the rental charge for a double room for a summer session term is $93.00 or $46.50 per person.

Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students making application for housing. Occupants are expected to abide by these regulations.

Room reservations are made with the Housing Bureau. An applicant who has been officially accepted as a resident student is assigned a room according to an established plan. The initial $25.00 room deposit is effective for the entire college course of the student whose attendance during regular terms is continuous. The deposit will be refunded to resident students under the following conditions: (a) within thirty (30) days after the student has been graduated, (b) upon student's withdrawal from the University residence halls provided a written notice is received in the Housing Bureau by August 1 for cancellation of reservation for the fall semester and not later than January 15 for cancellation of reservation for the spring semester, (c) when the reasons requiring withdrawal are beyond the student's con-

trol. No refund is made until the occupant has checked out of her room through the Housing Bureau and has settled all her accounts with the Bursar.

Freshman students are assigned to Hanes House Annex. The Housing Bureau with the assistance of the Orientation Committee selects a roommate for a new student who is assigned to a double room but has made no arrangement for a roommate. After a student has been in residence for one semester, she is responsible for obtaining and keeping a roommate if she continues to occupy a double room. If a student occupying a double room does not obtain a roommate within a period of seven (7) days after written notice has been sent from the Housing Bureau, she may be required to pay the rental consideration for the whole room.

After a student has engaged a room she is not permitted to move to another without the consent of the Housing Bureau. A student leaving one room and occupying another without permission may be charged for both rooms for the entire semester. No student is allowed to rent or sublet her room to another occupant.

Residence hall rooms are reserved by upperclass students in accordance with the plan that is published during the school year. All rooms that have not been reserved on or before the announced date will be considered vacant for the succeeding semester and will be assigned to others.

The rooms are equipped with only the principal articles of furniture. Each student provides her own linens, blankets, bedspreads, and curtains. She may supply additional articles, but large rugs and additional furniture which make cleaning difficult are prohibited.

## *Scholarships, Loans, Grants-in-Aid*

SCHOLARSHIPS: Scholarships intended to recognize outstanding students are awarded annually to candidates who evidence qualities which give high promise of excellence in Nursing.

Candidates for competitive scholarship prizes should initiate applications during the fall semester of the senior year of study in secondary school. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for these awards.

All candidates for scholarships are required to take the Scholastic Aptitude Test and three Achievement Tests; English Composition is required as one of the three Achievement Tests of the College Entrance Examination Board in order to qualify for consideration by the

Scholarship Committee. The test must be taken either in December or January prior to the September in which admission is sought.

AWARDS: A maximum of eleven scholarships will be awarded annually without reference to geographical area.

ELIGIBILITY: Any student who has been accepted for enrollment by February 15 to the freshman class of the Duke University School of Nursing in the ensuing academic year is eligible to compete for a scholarship award.

OBJECTIVE: These awards are scholarships based on merit. They are intended to encourage young women who give promise of becoming leaders in the field of nursing. Financial need is not a factor in making the awards. The size of the stipend assigned to each winner, however, will vary to some extent with the financial circumstances of the recipient. The honorary stipend for students needing no assistance will be $200.00 annually, while the stipend may be as large as $1200.00 for the students who need maximum aid.

BASIS OF AWARDS: The Scholarships will be awarded on the following basis:

1. Secondary school scholastic record (candidates will be restricted to the highest quarter of their classes).
2. College aptitude as shown by tests, particularly the Scholastic Aptitude Test and the Achievement Tests of the College Entrance Examination Board.
3. Breadth of interests and native ability as indicated by extracurricular activities.
4. Participation in church, civic, and other organizations with particular reference to the demonstration of qualities of leadership.

DURATION OF AWARD: The award will be made for one year renewable for a second year on the condition that the holder maintain a scholastic average in the top quarter of her class or a "B" average, and further that she show evidence of developing the qualities of leadership which served as the basis for the original selection. The maximum duration of the award will be two years.

METHOD OF SELECTION: A scholarship Committee of Duke University faculty members will select the winners and alternates on the basis of the applications submitted. All applicants will be notified of their eligibility for competition by May 15, 1965.

PROCEDURE: All candidates for Duke University School of Nursing Scholarships and grants-in-aid who wish to be considered for awards on the basis of their financial circumstances are required to complete the Parents' Confidential Statement of the college scholarship service. This statement may ordinarily be obtained from the

high school guidance counselor or principal. Application for scholarship must be submitted by February 1 to the Office of Admissions, Duke University School of Nursing, Durham, North Carolina.

GRANTS-IN-AID: Although sufficient funds are not available to assist all applicants who present requests for aid, a number of grants-in-aid are made each year to able students who need financial assistance in order to meet the cost of attending college. Any candidate for admission, therefore, who considers herself to be in such need is eligible to apply for a grants-in-aid.

Applicants for grants-in-aid will be required to submit a detailed statement of financial resources.

The following scholarship fund is available to nursing students who apply for grants-in-aid.

FLORENCE K. WILSON SCHOLARSHIP FUND

Established in 1961 by combining the Nurses' Alumnae Association Scholarship Fund, the students' Florence K. Wilson Scholarship Fund and contributions from the Wilson family and friends; the income to be used for scholarships for students enrolled in the School of Nursing.

REMISSIONS OF TUITION: Certain students attending Duke University are entitled to a remission of the University tuition charge. Students in this group are entitled to a maximum of eight semesters of free tuition at the undergraduate level. Each Summer Session in which work is taken and each semester spent in another institution will be counted as one of the eight allowable semesters. Only those students enrolled in the regular Nursing School program leading to a Bachelor of Science degree in Nursing are entitled to a remission of tuition charge.

Children of ministers who are members of the North Carolina or Western North Carolina Conferences of the Methodist Church are entitled to a remission of the University Tuition charge, as are the children of ministers of all faiths residing in Durham County, North Carolina. This consideration is given only to children of resident members of the two North Carolina conferences who are giving their full time to religious work.

TUITION GRANTS: Tuition grants are given to the children, step-children, and adopted children of certain qualified staff members of Duke University.

LOANS: Since the attainment of college education, like the purchase of a home, is an expensive undertaking students may find it necessary to borrow a portion of the funds required. Duke University has student loan funds available which supplement the program of scholarships and grants-in-aid. All candidates for loans must make a minimum grade of "C" in the semester preceding their appli-

cation for a loan. Freshmen, therefore, will ordinarily be recommended by the University Scholarship Committee for a student loan which will not exceed the amount of tuition for the second semester.

Loans are granted from the Joseph F. Stein Student Loan Fund by the University Loan Committee upon the recommendation of the Dean of the School of Nursing. This fund was established to provide a means of assistance to students to meet pressing financial problems. The amounts to be loaned are limited in size and will not be charged interest rates if paid prior to termination of the program or if the student completes her program. Should a student, with an outstanding loan, withdraw from the school before she has completed her program, interest will accrue at 3% per annum for the first five years; 6% per annum after 3% ceases to be effective. Monthly payments shall be made on the first day of the next following October and continuing on the first day of each month thereafter of at least two per cent of the amount of the principal balance on the June 30th next prior to the date on which the first such monthly payment becomes due.

## *Army and Navy Nurse Corps Student Program*

Students in the Basic Nursing Programs may apply for appointments in the Army Student Nurse Program at the beginning of their Junior year, or the Navy Nurse Corps Candidate Program at the beginning of their Senior year. The appointments carry generous financial allowance. A student who participates twelve months or less serves on active duty in the respective service for 24 months. If 2 years support has been given, she serves 36 months.

Graduate Nurse Students enrolled in the Undergraduate Program may apply for the same appointment in the Army Student Nurse Program if they have completed their diploma program within the past 30 months and are able to complete the requirements for their degree within 24 months.

These opportunities are open only to students enrolled in programs accredited by the National League for Nursing.

# General Regulations Undergraduate Students

## *Orientation Program*

ALL FRESHMEN and transfer students are required to participate in the activities of Orientation Week. The program includes placement tests, orientation lectures, physical examinations, social events, special religious services, registration, and enrollment. New students who miss the whole or a part of the Orientation Program place themselves at a serious disadvantage at the very outset of their college career.

## *Registration*

Students who register in either semester at a date later than that prescribed must pay to the Treasurer a fee of $5.00. Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

## *Health Regulations*

Before admission to the School of Nursing, a student is required to have a physical examination by the family physician and to be immunized against typhoid fever, diphtheria, tetanus, smallpox and poliomyelitis. Physical defects, such as defective vision, dental needs, etc., must be corrected before admission.

Before final acceptance, each student is required to undergo a physical examination under the School's direction during Orientation. Students whose condition needs further observation may be admitted tentatively, but must cancel their applications if findings prove them physically unable to pursue the program.

## *General Academic Regulations*

QUANTITY CREDIT AND COURSE LOAD: The term of credit used is the semester hour which signifies one class period a week throughout the semester. Two or four hours of laboratory work are equivalent to one hour of class work. Two semesters of seventeen weeks each or three quarters of twelve weeks each constitute the aca-

demic year. For the degree of Bachelor of Science in Nursing, credit for 135 semester hours is required.

The normal load of a student is four or five academic and professional courses totaling 15 to 19 semester hours per semester during the freshman and sophomore year or 6 to 9 semester hours per quarter during the junior and senior years, exclusive of physical education. No student is permitted to take less than 14 semester hours of work per semester during the freshman and sophomore years or 6 semester hours per quarter during the junior and senior years or more than the normal load during any part of her program without special permission from the dean.

QUALITY CREDIT: The requirements for the degree are computed in semester hours and in quality points. Quality points are determined by grades as follows: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points. Credit for at least 270 quality points is required for the degree of Bachelor of Science in Nursing.

REQUIREMENTS FOR CONTINUATION IN COLLEGE AND FOR GRADUATION FROM COLLEGE: To continue in college and to graduate, students must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours, achieve a specified quality point ratio, and in the case of graduation earn a minimum number of quality points. The quality point ratio is calculated by dividing the accumulated number of quality points earned by the accumulated number of semester hours carried (not semester hours passed). These requirements are listed in the following table.

| For continuation from | The minimum requirement is |
|---|---|
| The first to the second year | 24 s.h. credit and a q.p.r. of 1.30 |
| The second to the third year | 56 s.h. credit and a q.p.r. of 1.60 |
| The third to the fourth year | 80 s.h. credit and a q.p.r. of 1.75 |
| The fourth to the fifth year, if needed | 114 s.h. credit and a q.p.r. of 1.85 |

For graduation the minimum requirement is 135 semester hours, 270 quality points and a quality point ratio of 1.9.

In addition to the qualitative standards listed above students must pass a minimum number of hours each semester. Freshmen must pass at least 6 semester hours of work in their first semester and 18 semester hours in their first year exclusive of physical education; all other students in their freshman and sophomore years must pass at least 9 semester hours each semester. Junior and senior students are expected to maintain a "C average" in nursing. The University may require a

student whose record is considered unsatisfactory to withdraw, although she has met the minimum requirements set forth in this paragraph. Any student whose standing in the School of Nursing indicates that she is performing below an acceptable level (minimum requirements) in either her academic or clinical courses, will be (after careful evaluation by the faculty) placed on probation. Both the student and her parents will be appropriately notified of this action.

Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semester. In addition, reports on freshmen are mailed at each mid-semester period.

CLASS STANDING: Students to rank as sophomores must have to their credit at least 26 semester hours and 52 quality points; and must have passed certain designated courses relating to their major; as juniors, at least 56 semester hours and 112 quality points and must have passed those courses relating to and including the nursing major; and as seniors, at least 90 semester hours and a quality point ratio of 1.75 and must have passed those courses relating to and including the nursing major.

## *Awards to Undergraduate Students*

THE FLORENCE NIGHTINGALE PLAQUE: The Florence Nightingale plaque is awarded to a graduating student by the Alumnae Association for leadership, scholarship and nursing skill.

THE MOSELEY AWARD: The Moseley Award of $25.00 is given to the student in the senior class who has shown the most skill in Nursing Arts throughout her program in the School of Nursing.

### RESIDENCE REQUIREMENTS

A minimum of 60 semester hours of senior-level work in the School of Nursing or in the colleges of arts and sciences must be earned in residence. Students who meet this requirement but who still lack 6 or 8 semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the head of the department concerned and by the Dean.

Students who complete in a summer session the work required by the University for the degree will be granted the degree at the end of the summer.

### GRADING AND EXAMINATIONS

Grading: Grades are reported to indicate the following:

(1) Passed. A, B, C, and D are all passing grades. The letters are intended to indicate the following quality of work. A, exceptional; B, superior; C, medium; D, passing.

(2) Failed. A grade of F indicated that the student has failed the course, and in order to receive credit for the course she must repeat the work in class.
(3) Incomplete. (a) A grade of I may be reported by the instructor if for any reason she is unable to report the final grade at the regular time. (b) Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is recorded as F, and the course must be repeated in class if the student is to receive credit for it.
(4) Absent from final examination. (a) The grade X indicates that the student was absent from the regularly scheduled examination. (b) If absence has been excused by the Dean the student may take the examination as arranged by the instructor concerned. (c) If absence from the examination is not excused by the Dean, the grade for the course concerned is recorded as F. (d) A student with an X grade who has not obtained a passing grade before the end of the semester following that in which the X was incurred is regarded as having failed in the course concerned and must repeat the work in class in order to receive credit.

MOTOR VEHICLES: Freshmen are not advised to own or operate motor vehicles at the University. Members of the upper classes may operate motor vehicles, however, when in accordance with University regulations.

Students permitted to operate motor vehicles must register them annually at the beginning of the fall semester, or if the vehicle is acquired later, within five days after bringing it to the campus. Such students must show a state vehicle registration and a state operator's license, and also a standard certificate of automobile liability insurance, issued by a recognized company and evidencing coverage of at least $5,000 per person and $10,000 per accident for personal injury and $5,000 for property damage. At the time of the registration of the automobile the University will collect an annual student parking rental fee of $30.00 for each automobile.

ENROLLMENT AND REGISTRATION: Students in residence are required to submit, not later than the date of the spring registration, cards showing their selection of courses for the following year. Evidence of the payment of the continuing preregistration deposit of $25.00 is required before the card may be submitted. These cards, approved by the dean, are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the time appointed must be readmitted to the college by application to the Committee on Admissions. The same regulations, with the exception of the advance deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that

prescribed must pay to the Treasurer a fee of $5.00. They are counted as absent in the work they have missed in the professional courses to which they are admitted, and these absences carry the same penalty as do other absences from the professional courses. Changes in courses for reasons not arising within the University require a payment of $1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

## FIRST AID COURSE

All students are advised to complete a Standard Red Cross First Aid Course before the date of enrollment in the School of Nursing. For those students who will find it impossible to complete such a course in their home communities, the local Red Cross Chapter will offer this course at the School of Nursing. Because of the heavy course load, the student will be at a disadvantage in planning to complete the course at the School of Nursing.

# Requirements for Degree

## BACHELOR OF SCIENCE IN NURSING

THE SCHOOL OF NURSING offers a program which is planned to cover a period of four years; four academic years and three summer terms. At the completion of this program, the student receives the degree of Bachelor of Science in Nursing and is then eligible for the examinations given by the North Carolina State Board of Nurse Examiners.

The School of Nursing offers to carefully selected persons a program based on experiences which are designed in sequential patterns to promote a concatenation of learning and growth. Classes are kept small and close contact with the instructor is encouraged. Whether in the classroom, hospital, laboratories, community, or in the extra-curricular activities, the development of the student's physical, mental and social well-being is the primary consideration of the faculty.

Graduates of the program are prepared as professional nurses for beginning positions in nursing and have the competencies and theoretical preparation on which to build further knowledge.

To fulfill the requirements for the degree of Bachelor of Science in Nursing, a student must complete the program with a C average, must complete 135 semester hours as outlined below, earn 270 quality points, and show proficiency in the practice of nursing.

The requirements for the degree of Bachelor of Science in Nursing are based on the principle that the student will derive the maximum benefit if the program includes a broad distribution of studies among representative fields.

For graduation with the degree of Bachelor of Science in Nursing, the following course work or equivalent must be completed.

These requirements are described in detail below.

| Uniform Course Requirements | s.h. |
|---|---|
| Natural and Biological Science | 20–23 |
| Social Sciences | 24 |
| English | 6 |
| Religion | 6 |
| Elective (Literature, Music, Art, or Philosophy preferred) | 6–9 |
| Physical Education | 2 |
| Major (Nursing and related work) | 68 |
| Total | 135 |

ENGLISH, 6 s.h.—This requirement is met by the completion of English 1-2.

NATURAL AND BIOLOGICAL SCIENCE, 20 s.h.—To satisfy this requirement

a student must complete laboratory courses in Physiological Chemistry (3 s.h.), Zoology, Botany, Chemistry or Physics (8 s.h.), Anatomy and Physiology (6 s.h.), and Microbiology (3 s.h.).

RELIGION, 6 s.h.—To meet this requirement 6 semester hours may be chosen from Religion 1-2, 51-52, 55, 65, 85, 93.

SOCIAL SCIENCE AND HISTORY, 24 s.h.—The following courses will satisfy this requirement: Education 118, Psychology 91 and 116; and Sociology 91, 92, and 150. The remaining 6 s.h. may be selected from History (students who do not present for entrance 2 acceptable units of History must select History), Political Science 11-12, or 61-62, or Economics 51-52.

LITERATURE, MUSIC, ART, AND PHILOSOPHY, 6-9 s.h.—This requirement can be satisfied by a total of 6-9 semester hours in courses in English or American literature, foreign literature courses, literature courses in translation, courses in aesthetics, art, music, and courses in Philosophy (except 48, 103, 104, 109).

PHYSICAL EDUCATION, 2 s.h.—In the School of Nursing, Physical Education is required during the first year and must be completed by the end of the first year.

MAJOR AND RELATED WORK, 68 s.h.—This requirement is met by completing courses in the School of Nursing in accordance with the regulations described.

To complete the requirements in the regular period (four years) of study, the work is planned as follows:

### FIRST YEAR

| | | |
|---|---|---|
| English 1-2 | English Composition | 6 s.h. |
| History 1, 2 | Modern History | 6 s.h. |
| or | | |
| Political Science 11-12 | The American System of Government | |
| Religion 1-2 | The English Bible | 6 s.h |
| or | | |
| Elective | (Music 1-2, Art 1-2 or Philosophy) | |
| Nursing 1-2 | Interpersonal Relations in Nursing | 4 s.h. |
| Zoology 1-2 | Animal Biology, General Zoology | 8 s.h. |
| Microbiology 4 | Microbiology | 3 s.h. |
| Chemistry 50 | Chemistry | 3 s.h. |
| Psychology 91 | Introductory Psychology | 3 s.h. |
| Physical Education | | 2 s.h. |
| | | 41 s.h. |

### SECOND YEAR

| | | |
|---|---|---|
| Anatomy 51 | Anatomy | 3 s.h. |
| Physiology 51 | Human Physiology | 3 s.h. |
| Chemistry 51 | Physiological Chemistry | 3 s.h. |
| Nursing 91-92 | The Fundamentals of Nursing | 13 s.h. |
| Sociology 91, 92 | General Sociology | 6 s.h. |
| Nutrition 53 | Nutrition and Diet Therapy | 3 s.h. |
| Education 118 | Educational Psychology | 3 s.h. |
| Elective | (Art, Philosophy, or Literature) | |
| or | | |
| Religion | The English Bible | 6 s.h. |
| | | 40 s.h. |

### THIRD YEAR

| | | |
|---|---|---|
| Nursing 120 | Pediatric Nursing | 6 s.h. |
| Nursing 130 | Obstetric Nursing | 6 s.h. |
| Nursing 140 | Medical Nursing | 6 s.h. |
| Nursing 150 | Surgical Nursing | 6 s.h. |
| Sociology 150 | The Family | 3 s.h. |

| | | |
|---|---|---|
| Psychology 116 | Psychology of Adjustment | 3 s.h. |
| Nursing 180 | Public Health Sciences | 3 s.h. |
| | | 33 s.h. |

FOURTH YEAR

| | | |
|---|---|---|
| Nursing 160 | Social Foundation of Nursing | 3 s.h. |
| Nursing 170 | Psychiatric Nursing | 6 s.h. |
| Nursing 181 | Public Health Nursing | 6 s.h. |
| Nursing 190 | Medical-Surgical Nursing | 6 s.h. |
| | | 21 s.h. |

# *Description of Courses*

## EDUCATION

118. EDUCATIONAL PSYCHOLOGY.—A study of psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 3 s.h. BALLANTYNE, GEHMAN, MCHUGH

## ENGLISH

1-2. FRESHMAN COMPOSITION.—Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the 20th Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. STAFF

## ENGLISH AND AMERICAN LITERATURE AND LANGUAGE

55, 56. REPRESENTATIVE BRITISH WRITERS.—The following works are studied in the first semester: Chaucer's Prologue to *The Canterbury Tales* and at least two tales, Shakespeare's *I Henry IV, Hamlet* or *King Lear,* and one other play, John Donne's poetry (selections), Milton's *Paradise Lost* (selections) and some of the shorter poems; in the second semester: Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 6 s.h. (E & W) STAFF

57, 58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works. The first semester will include Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; the second will include James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. 6 s.h. (E & W) STAFF

## HISTORY

1, 2. MODERN HISTORY.—This course is an introduction to the study of modern history with special reference to the issues in the modern world. Topics selected for emphasis are: the contest between liberty and authority in the modern state; changing economic organization and theory—capitalism and the challenges to it; the problems of peace and war among the states; the changing faiths men live and die by. Beginning about 1500 with the rise of the European dynastic states, the story is pursued in the first semester to approximately 1848, and in the second through the two great world wars. The central theme in both semesters is the expansion of the influence of Western Europe throughout the world, with some attention to the rise of the United States as a world power. 6 s.h. (E & W)

Sophomores and juniors are not admitted to this course.

PROFESSOR ROPP AND STAFF

51, 52. MODERN HISTORY.—An introductory course for sophomores, juniors and seniors dealing with the topics indicated in the description of course 1, 2. 6 s.h.
PROFESSORS PARKER AND ROPP; ASSOCIATE PROFESSORS ACOMB, HOLLYDAY, W. SCOTT AND YOUNG; DR. GINTER; MR. CELL

51X, 52X. MODERN HISTORY.—A special section for seniors who have had no other history at Duke and who wish a course in history before completing their college career. The topics covered will be essentially the same as those indicated in the description of course 1, 2. 6 s.h. PROFESSOR ROPP

## PHILOSOPHY

41, 42. KNOWLEDGE, FACT, AND VALUE.—An introduction to philosophy through the study of some of its main problems. These include, in Philosophy 41, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. In Philosophy 42 these include the nature and ground of values, ultimate goals and moral obligation. (Philosophy 42 may be taken before, or with, Philosophy 41.) 6 s.h. STAFF

## POLITICAL SCIENCE

11-12. AMERICAN AND EUROPEAN POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. An introductory course for Freshmen dealing with the topics indicated in the description of Political Science 61-62. (Open only to Freshmen) 6 s.h. ASSOCIATE PROFESSOR HALL; ASSISTANT PROFESSORS CHEEK AND KEARNEY; DR. MORGAN

61-62. AMERICAN AND COMPARATIVE POLITICAL SYSTEMS.—An introduction to the theory and practice of modern government. The first semester is devoted to the study of American constitutional democracy. Topics examined include federal-state relations, the separation and interrelationships of the executive, legislative, and judicial branches of government, judicial review, the role of political parties and public opinion, the formulation and execution of domestic and foreign policy, civil liberties. The second semester is devoted to a study of constitutional democracy in Great Britain and France with emphasis upon the similarities and differences between those systems and our own. Detailed attention is also given to an examination of the theory and practice of totalitarian dictatorship as exemplified in the U.S.S.R. 6 s.h. (E & W)
ASSOCIATE PROFESSORS LEACH AND SIMPSON; VISITING ASSOCIATE PROFESSOR JEWELL; ASSISTANT PROFESSORS CHEEK, HOWARD, AND KEARNEY; DRS. MORGAN AND PIPER; MESSRS. LOUINK AND PILANT

## REQUIRED PHYSICAL EDUCATION

Two semester hours to be completed in two semesters are included in the 135 hours required for graduates.

At the beginning of the freshman year, after a series of tests has been given, individual conferences are held and each student is guided into the type of activity she most needs, as determined from the evaluation of the test scores and the results of the conference. Courses in sports fundamentals, posture, rhythm fundamentals and swimming are offered for those who need to improve their skills in these areas. Students whose test scores are satisfactory will elect an activity from those offered by the Department.

For the last half of the first semester and for the two terms of the second semester, students take activities of their choice to complete their physical education requirement.
PROFESSOR GROUT, CHAIRMAN: PROFESSORS BOOKHOUT AND LEWIS; ASSOCIATE PROFESSORS EDDY AND HOLTON; ASSISTANT PROFESSORS LLOYD, SPANGLER, WOODYARD AND WRAY; MISS RAYNOR

## PSYCHOLOGY

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of normal adult psychology through a study of psychological methods as applied to motivation, emotions, perception, sensation, thinking, memory, learning, individual differences, and personality. 3 s.h. STAFF

116. PSYCHOLOGY OF ADJUSTMENT.—The course is planned to give an adequate understanding of problems of adjustment and of mental hygiene. Lectures and discussions cover an application of the principles and findings of normal and abnormal psychology as these relate to the adjustment of the average individual in our changing society; a survey of the principles of mental hygiene; discussions of current socio-cultural trends significant for individual adjustment.

Not open to students who have had Education 68 or Psychology 100. 3 s.h. (w)
ASSOCIATE PROFESSOR REICHENBERG-HACKETT

## RELIGION

The uniform course requirement in religion may be met in one of the following ways: (a) by completing, in the freshman year, Religion 1-2; (b) by completing, in the sophomore year or later, Religion 51-52; (c) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

Students who have fulfilled the uniform course requirement in religion are eligible to elect any course numbered 100 or above, except those for which additional prerequisites are prescribed. Courses numbered below 100 may not be taken by those who have completed the uniform course requirement in religion.

1-2. THE ENGLISH BIBLE.—A comprehensive survey of the books of the Old and New Testaments. The literature is examined in the light of its origin in the history and religion of the people of the Bible, in order that its theological significance in its own day and in ours may be understood. Open only to freshmen. 6 s.h.
STAFF

51-52. THE ENGLISH BIBLE.—A survey of the Old and New Testaments, similar to Religion 1-2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1-2. 6 s.h. STAFF

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 3 s.h. STAFF

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to his contemporary significance. Prerequisite: Religion 55. 3 s.h. PHILLIPS

85. INTRODUCTION TO CHRISTIAN ETHICS.—A brief analysis of the Biblical and historical bases for the Christian understanding of man's moral situation, followed by a study of the social implications of Christianity in such areas of life as marriage, race, the political and economic order, etc. Consideration is given to the relation of Christian ethics to moral philosophy. Prerequisite: Religion 55. 3 s.h. LANGFORD AND MCCOLLOUGH

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primative culture, several of the major living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. 3 s.h. BRADLEY AND SULLIVAN

## SOCIOLOGY

91, 92. GENERAL SOCIOLOGY.—An introduction to the scientific study of social life; its origin, evolution and organization as illustrated in the study of a number of concrete social problems. 6 s.h. STAFF

150. THE FAMILY.—Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. STAFF

## ZOOLOGY

1. ANIMAL BIOLOGY.—The principles of biology as applied to animals. 4 s.h.
ASSOCIATE PROFESSOR KLOPFER, AND STAFF

2. GENERAL ZOOLOGY.—A survey of the animal kingdom. Prerequisite: Zoology 1. 4 s.h. PROFESSOR BOOKHOUT; ASSOCIATE PROFESSOR HUNTER AND STAFF

## HUMAN BIOLOGICAL AND PHYSICAL SCIENCE

*Anat.* 51. HUMAN ANATOMY.—The student gains an understanding and appreciation of body structure and its relation to normal functions in health and abnormal functions in disease. Audio-visual aids, including television, are used extensively and in conjunction with laboratory work the anatomical structures are demonstrated on dissected human specimens. 3 s.h.
PROFESSOR MARKEE AND STAFF

*Physiol.* 51. HUMAN PHYSIOLOGY.—A study of the normal functions of the human body with references to their applications in health and disease. 3 s.h.
DR. GERBER

Scores on a Chemistry Achievement Test administered during Orientation Week will be utilized to determine placement in the Chemistry courses (Chemistry 50 or Chemistry 51).

*Chem.* 50. CHEMISTRY.—A course in the fundamentals of general inorganic chemistry with particular emphasis on the needs of the student nurse. A brief introduction to organic chemistry. 3 s.h. ASSOCIATE PROFESSOR THIERS

*Chem.* 51. PHYSIOLOGICAL CHEMISTRY.—This course is designed to aid the student in understanding the chemical mechanism of the human body both in health and in disease. The student also acquires knowledge concerning the chemical basis of diagnosis and therapy. 3 s.h. ASSOCIATE PROFESSOR THIERS

*Micro.* 4. MICROBIOLOGY.—From the learning experiences included in this course the student is enabled to understand and appreciate her role in the prevention of microbial disease. 3 s.h. DR. A. G. EIRING

## NURSING AND ALLIED ARTS

N1-2. INTERPERSONAL RELATIONS IN NURSING.—This is an introductory course which is designed to assist the student in further developing concepts and skills that are basic to competence in interpersonal relations and nursing therapy. The student begins to define and amplify her concepts of the role of the professional nurse. Content of the course is based on the belief that a conscious possession of interpersonal concepts and goal directed behavior is basic to professional management of nurse-patient situations. 4 s.h.
ASSISTANT PROFESSOR JOHNSON AND STAFF

Nutr. 53. NUTRITION AND DIET THERAPY.—This course considers the nutritional needs of individuals of varying ages and methods of meeting these needs under different economic and social conditions. Accepted principles of diet therapy are presented on which dietary modifications are based, as well as the practices based on these principles. 3 s.h. ASSOCIATE PROFESSOR MCLACHLAN AND STAFF

N91-92. THE FUNDAMENTALS OF NURSING.—A study of the fundamentals of patient care which aims to give the student a basic knowledge and understanding of the principles and skills of nursing care. Throughout the courses, the student has correlated experiences in patient care and has the opportunity to participate in patient-centered conferences both of which are designed to assist her in the process of integrating the concepts of the behavioral and the natural sciences in her approach to nursing care problems. Emphasis is placed upon developing therapeutic nurse-patient relationships. 13 s.h.
ASSISTANT PROFESSORS CAMPBELL AND GOVER; MRS. AHLGREN; MESDAMES CHURCH AND STRAUB, AND MISS MRAZ

N120. PEDIATRIC NURSING.—This course focuses on child care and the nurse-child-family relationships. Laboratory experiences include observation and participation in the care of children in hospital and non-hospital environments.
ASSISTANT PROFESSOR FORGIONE; MISSES AGNER AND COLLINS, AND MRS. PAULSON

N130. OBSTETRIC NURSING.—This course focuses on maternal and infant care in the hospital and home. Emphasis is placed on support and guidance to the expectant family. 6 s.h.
Assistant Professors Forgione and Horton; Mesdames Proctor, Hogue, and Couch

N140. MEDICAL NURSING.—The classes and experiences of this course are designed to help the student identify the individual needs of medical patients and adapt her nursing care to meet these needs. Experiences are provided on the wards, out-patient clinic and related areas in the hospital. 6 s.h.
Assistant Professors Harris, Hogsed; Miss Lemmond

N150. SURGICAL NURSING.—The classes and experiences are designed to assist the student in developing a concept of continuity of nursing care for the surgical patient. Experiences are provided on the wards, in the operating room and in the recovery room. 6 s.h.
Assistant Professor Harris; Mrs. Hirsch, Miss Janoscrat

N160. SOCIAL FOUNDATION OF NURSING.—A survey of major historical, philosophical, and sociological factors which have affected Nursing and Nursing Education. The purpose of the course is to give the student a better understanding of the place of nursing in present day society and the responsibilities of the individual nurse to society. 3 s.h.
Professor Jacobansky

N170. PSYCHIATRIC NURSING.—This course focuses on dynamic psychiatric nursing therapy and dynamic psychiatry. It includes opportunities for learning under close supervision through experience with one patient at a time. 6 s.h.
Assistant Professors Johnson and McColl; Miss Ritchie; Mrs. Bullock

N180. PUBLIC HEALTH SCIENCE.—This course offers a body of knowledge derived from the field of public health which includes an introduction to public health administration, environmental sanitation, bio-statistics and epidemiology. 3 s.h. Prerequisite to N181.
Associate Professor Brocker; Assistant Professor Watling; Visiting Lecturers

N181. PUBLIC HEALTH NURSING.—This course provides opportunities to develop the philosophies and to study the principles and processes of nursing in a public health setting, through classes and selected community nursing experiences with faculty guidance at the Durham County Health Department. 6 s.h.
Associate Professor Brocker; Assistant Professors Campbell, Watling, Young; Miss Mitcham

N191. MEDICAL-SURGICAL NURSING.—The classes and clinical experiences are designed to consider the more complex nursing problems encountered in nursing care. Opportunities are also provided for the student to further develop her competencies in leadership skills and problem solving techniques. 6 s.h.
Assistant Professors Harris, Wilson, Caddell, Davenport

# Graduate Program of Study

## *General Regulations Governing*

THE DEGREE of Master of Science is offered in the field of Medical and Surgical Nursing, Maternal and Infant Health*, Pediatric Nursing* and Psychiatric Nursing.*

## *Admission*

### REQUIREMENTS FOR ADMISSION TO GRADUATE STUDY IN NURSING

1. Completion of an NLN accredited baccalaureate degree program in nursing which prepares for professional practice in all fields of nursing. (Provisional admission may be granted to applicants not fully meeting this requirement).
2. A record of undergraduate study that meets general standards for admission to graduate study at Duke University.
3. State registration for the practice of nursing.
4. Two recommendations from persons who are acquainted with the applicant's professional ability and capacity for graduate study.
5. NLN Graduate Nurse Examination scores will be requested prior to admission from applicants whose records are marginal.
6. Satisfactory health appraisal.
7. A personal interview may be required.

PROCEDURE FOR ALL APPLICANTS: Interested nurses should write to the Director of Graduate Studies, School of Nursing, Duke University, Durham, North Carolina. A brief biographical statement should be included in this letter. The nurse will be furnished an application form. In addition to the completed form the following supporting documents should be provided: (1) transcripts of all undergraduate and graduate work mailed directly by registrars; (2) two letters of recommendation written by persons qualified to judge the applicants professional ability and capacity for graduate study; (3) a record of health appraisal; (4) evidence of registration to practice nursing; and (5) scores on qualifying examinations when requested.

DEADLINES FOR APPLICATIONS: The application and all supporting documents should be submitted to the Office of Admissions

* Not offered in 1964-1965.

not later than June 1 by those applying for the fall semester; before May 12 for admission to the first term of summer; and before June 18 for admission to the second term. It is the student's responsibility to make certain that her application is complete and in order before the dates specified. Students who are applying for Traineeship assistance are advised to assemble their credentials early in the calendar year in which they anticipate admission to graduate study.

NOTIFICATION AND STATUS: When the application is approved, the student will receive a letter of admission. The process of admission is not complete until a statement of acceptance has been returned by the applicant.

Applicants who are admitted will be offered either full admission or provisional admission. PROVISIONAL ADMISSION to one semester or a minimum of 12 hours of course work is offered to students who do not fully comply with admission requirements but appear to warrant admission. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and when upon review the student is granted full admission.

## *Registration*

WHO MUST REGISTER. (1) All students who enter course work for credit; (2) all students who have completed minimum requirements for an advanced degree but continue to use the facilities of the University in their research.

REGISTRATION. After the applicant has received notification of admission and has submitted a statement of acceptance of admission, she is eligible for registration.

LATE REGISTRATION. All students are expected to register at the time stated. *Those registering later are subject to a late registration fee of five dollars.*

CHANGE OF REGISTRATION. During the academic year within a period of fourteen days from the specified day of registration, students may change their schedules with the approval of the Director of the Graduate Program.

## *Grades, Hours, and Credits*

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in terms of course hours and credits. Peculiar to graduate study is the term *residence,* also generally measured in hours, to designate individual study apart from courses, such as writing a thesis and preparing for general examinations. Since September 1959 in this University,

graduate credit for courses and seminars, research, and residence, and corresponding tuition and fees have been stated in terms of UNITS. According to conventional measurement ONE UNIT is equivalent to ONE SEMESTER HOUR. Thus a course previously described as carrying a credit of 3 s.h. now carries a credit of 3 units.

GRADES. Grades in the Graduate Program are as follows: *E, G, S, F,* and *I. E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, for a satisfactory reason, at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, a statement of *No Credit* is made upon the student's record.

COURSES PRIMARILY FOR UNDERGRADUATES. Students granted provisional admission may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses *outside the major department* may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Director of the Graduate Program in the major department and in the department in which the course is listed.

NORMAL PROGRAMS. Normally graduate students who do not carry teaching or assisting duties carry a full load of graduate work until the requirements of the degree are met.

WITHDRAWAL AND INTERRUPTION OF PROGRAM. *From a course.* After 14 days from the date of registration students may drop courses only with the approval of the Director of the Graduate Program, the instructor of the course to be dropped, and the Dean of the School of Nursing. If the course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F.* If a course is dropped 30 days or more after the beginning of the class for the semester involved, the status of the student at the time of withdrawal from the course will be determined and be indicated by the designation *Withdrew Passing* (W.P.) or *Withdrew Failing* (W.F.).

*From the School.* The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the

School she should notify both the Director of the Graduate Program and the Dean of the School prior to the date of her expected withdrawal.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, provide in writing a statement of the reason for interruption, mailing address, and expected date of return.

TRANSCRIPT. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Records Office.

## *Financial Regulations*

GENERAL FEES IN THE ACADEMIC YEAR. The following tables show the general fees and changes collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Treasurer of the University for the settlement of fees.

| | |
|---|---|
| Tuition per semester | $525.00 |
| General fee* per semester | 93.50 |
| Summer Session .....per unit | 35.00 |

* General fees, in lieu of most special charges, include the following fees: Mathematics, Athletic, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Materials fees. Expenses for field trips are not included.

Tuition and fees for a full semester program of 16 units amount to $618.50. For a part program in the regular semesters, tuition and fees are computed at the rate of $35.00 per unit plus $5.00 fee for each course. Tuition and fees for course work in the Summer Session are computed at the rate of $35.00 per unit. Federal traineeships are available for a selected number of qualified applicants.

WITHDRAWAL FROM A COURSE OR FROM THE GRADUATE PROGRAM. Arrangements made with the Treasurer to prorate tuition and fees due do not imply that the full amount is not due and payable. A student who after 14 days after the date of registration withdraws from a course or from the Graduate School is liable for payment of full tuition fees and room rent.

LIVING ACCOMMODATIONS. Graduate students in the School of Nursing may occupy rooms in the School of Nursing residence. The rental charge for a single room is $465.00 for the 12 month period. The rental charge for a double room is $395 for each occupant. Rooms are rented for a period of not less than one semester unless special

arrangements are made through the Housing Bureau after official acceptance for admission to the University. Students may arrange for apartments or rooms in private homes in the city. The Housing Bureau of the University maintains a file of rooms and apartments listed with it for rental. Students may use this file as an aid to locating suitable living accommodations.

DINING SERVICE. Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates $1.75 to $2.25 per day, depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and, in addition, the Oak Room where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 P.M. The prices are the same as in the West Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

MEDICAL CARE. The complete medical facilities of the Duke University Medical Center are available to all members of the University community. To secure the benefits of the Student Health program, a graduate student during the term or semester in which the illness occurs must 1) in the Summer Session term be registered for at least 3 units, 2) prior to completing minimum residence requirements be registered for at least 9 units per semester. Students are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided at the Health Office in Hanes House.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions, and elective surgery.

Graduate students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefit shall be applied to the cost of their medical care.

MOTOR VEHICLES. Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 07 Allen Building within five days after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student should present the following documents: (1) state vehicle registration. (2) state operator's license, (3) evidence of automobile liability in-

surance as required by North Carolina law ($5,000 per person, $10,000 per accident for personal injuries; $5,000 for property damage).

STUDENT ACTIVITIES. Graduate students new to Duke University may be reminded that they are welcomed to use such recreation facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, drama, and religious groups. They may become junior members of the American Association of University Professors.

BUREAU OF TESTING AND GUIDANCE. The University maintains a Bureau of Testing and Guidance which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

# Master of Science in Nursing

## *Philosophy and Purpose of Graduate Education*

At Duke University, Graduate Education in Nursing operates within the organizational structure of the School of Nursing and derives its rights and responsibilities from the statutes of Duke University. It conducts its educational programs in accordance with policies which regulate the educational status of graduate students within this University. While the School of Nursing regulates its own educational affairs, the graduate faculty in nursing maintains a cooperative relationship with other faculties within the University and utilizes the educational resources of other graduate programs that are appropriate to its purposes.

Fundamental to Graduate Education in Nursing is the philosophy of Duke University as epitomized by its motto, *Eruditio et Religio,* which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities and his responsibilities."

Graduate Education in Nursing takes its direction from the belief that nursing is a social institution designed to serve man in relation to his health status as determined by his preventive, therapeutic, and rehabilitative health needs. It draws from philosophy and from the natural and social sciences knowledges applicable to its own professional problems.

Graduate Education in Nursing contributes to the advancement of the profession of nursing by the development of understandings and abilities essential to leadership roles in nursing and their correlation with those of other health disciplines, to an extension of nursing knowledge and its application to current and emerging health needs of society, and to effective group functioning.

The ultimate aim of Graduate Education in Nursing is the improvement of nursing practice and of nursing education. To this end, Graduate Education in Nursing furthers individual professional de-

velopment and fosters the use of thought processes such as analysis, synthesis, and evaluation essential to the solution of problems associated with the provision of nursing services and the education and supervision of nursing personnel. It provides organized programs of study designed to realize its aim.

At Duke University, Graduate Education in Nursing has as its purpose the provision of learning opportunities for graduates of accredited baccalaureate programs in nursing to develop: advanced nursing competency in patient care; ability to communicate these learnings through the processes of teaching and supervising in nursing; ability to critically consume, utilize, promote and participate in research in nursing and allied health fields; and ability to assume and use leadership roles and resources for the advancement of the Profession of Nursing and for continued professional growth.

## REQUIREMENTS FOR THE MASTER OF SCIENCE IN NURSING

1. Satisfaction of subject matter deficits in undergraduate study that have resulted in provisional admission to graduate study, such as psychiatric and public health nursing and educational psychology or their equivalents.
2. Matriculation for the degree Master of Science in Nursing upon satisfactory completion of the initial 12 units of graduate work and the approval of the Director of Graduate Studies.
3. Satisfactory completion of the program of studies.
4. Passed comprehensive examination.

RESIDENCE REQUIREMENTS. Candidates for Master's degree must spend, as a minimum, one calendar year at Duke University. Often more time will prove necessary depending upon the nature of the student's program of studies.

TRANSFER OF GRADUATE CREDITS. Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum period of full-time registered residence at Duke University.

TIME LIMITS FOR COMPLETION OF MASTER'S DEGREES. The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of her first registration in the Graduate Program. Any candidate must complete all requirements within six calendar years of her first registration.

Credits earned over a longer period of time cannot be credited toward a degree.

In her graduate work the student must present satisfactory achieve-

ment for a minimum of 38 units of graduate credit. Nine of these units are earned outside of the major (Nursing) and are selected with the approval of the major professor from the course offerings in the natural and social sciences which correlate with her program of study in Nursing.

## GRADUATE STUDY IN NURSING

Emphasis is placed throughout graduate study in nursing on critical thinking and on the ability to analyze and evaluate situations, to identify problems, to synthesize knowledges for arriving at conclusions, solutions, or improvements, to teach and guide others, and to function within an organized social group such as a faculty or service agency.

The interrelatedness of principles and processes involved in nursing care and in the teaching and supervising of nursing is stressed. Problems affecting either or both are the content of nursing seminar.

Nursing theory, research process, and functional subjects are presented in a correlated manner and concurrently with directed experience in patient care and in the teaching or supervising of nursing care.

The curriculum also includes courses that enable the student to deepen understanding of the scope of nursing and of nursing education; the major problems confronting the profession; the changing social scene and related health organization and leadership roles in nursing; and the relatedness of nursing to other disciplines concerned with human welfare.

Theory concerned with human interacting and with the psychophysiological aspects of health and illness is offered. Provision is made for both intra and interdisciplinary communication and collaboration. Students are assisted toward a conscious and purposeful use of the professional self.

Research orientation is accomplished through theory in research process and methodology, nursing research seminar, and the inclusion of related researches in other course content. Students are required to define a research problem in nursing and to develop the research design. The completed dissertation is not a requirement for the Master of Science in Nursing. Research guidance is provided for the realization of the research requirement and is extended for the student who elects to complete the dissertation.

The general curriculum design for graduate study includes the following courses required of all graduate students of nursing:

Research in Nursing ..... (2 units)
Seminar in Nursing Research ..... (3 units)
Principles and Processes of Teaching
and Supervising in Nursing ..... (2 units)

Curriculum Development and
Improvement in Nursing ..... (3 units)
Perspectives in Health Promotion
and Patient Services ..... (3 units)
Human Behavior and
Psychophysiology ..... (4 units)
Related Science ..... (9 units)

In addition, individual programs provide theory, practice and seminar for both the advancement of clinical nursing competency and the development of initial competency in teaching or supervising within the student's selected area of clinical specialization in nursing (12 units).

The program of study covers two semesters and the full summer session. Students are admitted in the Fall of each year.

## *Medical-Surgical Nursing Program*

*Fall Semester*

| | |
|---|---|
| *N231 Medical and Surgical Nursing | 6 units |
| N235 Research in Nursing | 2 units |
| N250 Human Behavior and Psychophysiology | 2 units |
| N233 Principles and Processes of Teaching and Supervising in Nursing | 2 units |
| Related Science | 3 units |
| | 15 units |

*Spring Semester*

| | |
|---|---|
| *N232 Medical and Surgical Nursing | 6 units |
| N234 Curriculum Development and Improvement in Nursing | 3 units |
| N251 Human Behavior and Psychophysiology | 2 units |
| Related Science | 3 units |
| | 14 units |

*Summer Session*

| | |
|---|---|
| *N237 Perspectives in Health Promotion and Patient Services | 3 units |
| N239 Seminar in Nursing Research | 3 units |
| Related Science | 3 units |
| | 9 units |

N231-232. MEDICAL AND SURGICAL NURSING (12 units).—Provides theory; directed experience in patient care and in the teaching and supervising of nursing; and nursing seminar. Studies and evaluates patient needs and related nursing process in light of natural, behavioral and health sciences. Stresses the continuum of care, rehabilitation philosophy and principles, and interdisciplinary collaboration for patient welfare. Seminar is directed at the identification, evaluation, and solution of problems affecting nursing and the teaching or supervising of nursing. Directed experience provides opportunity for: (1) advancing content, synthesizing knowledges and testing theories of nursing practice; and (2) the development of initial competencies in teaching or supervising in nursing.
(Fall and Spring Semesters) MISS MATTINGLY AND FACULTY

* Includes: Theory (2); Directed Clinical Experience (3); and Nursing Seminar (1).
* Includes: Theory (2); Directed Teaching or Supervision in Nursing (3); and Nursing Seminar (1).
* Includes: Theory (2); and Selected Field Observations (1).

N233. PRINCIPLES AND PROCESSES OF TEACHING AND SUPERVISING IN NURSING (2 units).—Considers the principles and processes of teaching and supervising and their application to nursing. Studies criteria for the selection and use of methods and materials in formal and informal learning-teaching situations in nursing. (Fall Semester) MISS MINNIEAR

N234. CURRICULUM DEVELOPMENTS AND IMPROVEMENT IN NURSING (3 units).—Studies trends and factors influencing curriculum development in nursing, educational programs in nursing, essentials to curriculum improvement, and criteria for program evaluation. MISS MATTINGLY

(Spring Semester, Prerequisite N233)

N235. RESEARCH IN NURSING (2 units).—Studies research process and methodology through analytical and critical review of research in nursing and related fields, the definition of individual research problems in nursing, and the formulation of research designs. (Fall Semester) MISS MATTINGLY

N237. PERSPECTIVES IN HEALTH PROMOTION AND PATIENT SERVICES (3 units).—Examines leadership roles in nursing as related to the current and emerging social scene and programming at the local, national, and international levels. Offers selected field observation and conference experiences. (Summer Session) MISS MINNIEAR

N239. NURSING RESEARCH SEMINAR (3 units).—Provides opportunity for students to present and justify their individual research problems and to analyze previous learnings toward the identification of additional problem areas for nursing research. MISS MATTINGLY

N250-251. HUMAN BEHAVIOR AND PSYCHOPHYSIOLOGY (4 units).—Presents the current theory of psychophysiology with the aim to develop deepened appreciation of the personality-illness relationship and of the influence of psychological factors in the genesis of somatic reactions and of somatic disease. DR. RECKLESS

RELATED SCIENCE. Students elect nine units of credit from the course offerings in the natural or social sciences which correlate with their nursing subjects and can be taken concurrently with them.

# THE SUMMER SESSION

First term begins June 10, 1964

Second term begins July 17, 1964

# Admission

Students in the following categories may be admitted to the Duke University Summer Session:

1. Graduates and undergraduates who are presently enrolled and in good standing in Duke University.
2. Graduates and undergraduates who have been formally admitted, or re-admitted, to Duke University.
3. Students who are currently in good standing at their respective institution and who have approval by the proper authority to take and transfer credits earned in the Duke Summer Session.
4. Teachers in service with or without the Bachelor's degree who wish to earn credits for certification purposes.

Admission to specific courses offered in the Summer Session is governed by the student's academic status (freshman, sophomore, junior, senior, graduate, special or unclassified) and by the prerequisites of the course in question.

## *General Registration*

CLASSES BEGINNING JUNE 10. All Summer Session students whose classes begin on June 10, Term I, who *do not* complete registration in the Summer Session Office, 119 Allen Building, on or before June 5 *must* present themselves at general registration in Central Records Office, 103 Allen Building, on June 9 to register. Students will register during 30-minute periods alphabetically according to *surname* as indicated in the following table.

| *Time* | *Registrants (Surname)* |
|---|---|
| 8:30– 9:00 | A–B |
| 9:00– 9:30 | C–E |
| 9:30–10:00 | F–H |
| 10:00–10:30 | I–L |
| 10:30–11:00 | Mc–N |
| 11:00–11:30 | O–P |
| 11:30–12:00 | Q–R |
| 12:00–12:30 | S–T |
| 12:30– 1:00 | U–Z |

CLASSES BEGINNING JUNE 16. All Summer Session students whose classes begin on June 16, Term I, must complete registration in the Summer Session Office, 119 Allen Building, on or before June 15.

CLASSES BEGINNING JULY 17. All Summer Session students who wish to register for courses offered during Term II or for research during Term II may register in the Summer Session Office on July 3 through July 11. All students who *do not* register for second term during this period *must* register in Central Records Office, 103 Allen Building, on July 16, between 8:30 a.m. and 1:00 p.m.

CLASSES BEGINNING ON OTHER DATES. All Summer Session students registering for courses beginning on dates other than those specified above must complete registration in the Summer Session Office *before* the date on which their classes begin. *Registration on the day on which classes are scheduled to begin will be considered late registration.*

# Financial Information, Living Accommodations, and Medical Care

## *Fees*

The University Fee:
Covering registration, tuition, and medical care.....$35.00 per semester hour ($35.00 per unit in Graduate School)
Teachers in full-time service in Elementary and Secondary schools .....$15.00 per semester hour
Divinity School students approved by the Dean of that school .....$17.50 per semester hour

Laboratory Fees: (These where applicable are in addition to the University Fee.)
Marine Laboratory .....$10.00 per course
(For Marine Laboratory investigators' research table fees see Marine Laboratory Bulletin.)

Fees Replacing University Fee:
Medical Mycology .....$100.00

Master's Degree Summer Session Fee:
A candidate for the Master's degree who completes in the Summer Session 15 or more semester hours required for the degree and who finishes the work in the Summer Session pays a degree fee of.....$25.00
A Master's degree candidate who is not required to pay the fee under Item I above, but who takes a thesis examination during the Summer Session, is required to pay a degree fee of .....$10.00
A Master's degree candidate who, in the fall or spring semesters, completes 15 or more semester hours required for the degree and who finishes the work in the Summer Session without a thesis examination is not required to pay the degree fee.

Auditing Fees (See p. 24 for definition):
1. Students registered for a full course program may audit non-laboratory courses (with the permission of the Director) at no extra charge.
2. Students carrying less than a full course program may be granted permission to audit a course or courses on payment of half the University fee per semester hour audited .....$17.50 per s.h.

Late Registration Fee:
Students who fail to register prior to the first class day of a given course will pay an extra fee of .....$ 5.00

Fee for Course Changes:
Course changes other than those required by the University will be made only on payment of an extra fee of .....$ 1.00

Fee for Make-up Final Examination .....$ 5.00

Refund of Fees:
a. When applications for withdrawal are received by the Director of the Summer Session before the close of registration on registration day, full fees will be refunded.

b. When applications for withdrawal are received by the Director of the Summer Session during the first four class days of a given term 80 per cent of the fees will be refunded.

c. When applications for withdrawal are received by the Director of the Summer Session after the fourth class day there will be no refund of fees.

Estimated cost of one term of Summer Session:

| | |
|---|---|
| University Fee, 6 s.h. | $210.00 |
| Teachers (elementary and secondary) in full-time service, $75.00 | |
| Dormitory Rooms (2 occupants, $35.00 per person) | 35.00 |
| Meals (Cafeteria selective; average per day $2.00) | 72.00 |
| Books and Class Materials $7.00 to $10.00 | 8.50 |
| Miscellaneous (laundry, etc.) | 12.00 |
| Total (elementary and secondary teachers in full-time service deduct $120.00) | $337.50 |

# Academic Regulations

## *Kinds of Course Enrollment*

SUMMER SESSION courses may be taken for "credit" or for "non-credit" or may be "audited." A student's program may be exclusively in one of these categories, or may combine any two of them or all three. Students taking a full or partial program for "credit" may enroll as auditors or as non-credit students in any number of additional courses.

CREDIT. The Summer Session term "credit" does not mean degree credit at Duke University unless the student has been admitted as a degree candidate by one of the colleges or schools of the University. A student taking a course for credit is expected to do all the work required and to take the final examination, and he will receive a grade. G.I. Bill benefits are available only to those veterans who enroll for credit.

NON-CREDIT. "Non-credit" enrollment is available to the student who wishes the privilege of participating in class discussions, exercises, and the laboratory assignments but does not wish to take the examinations, either mid-term or final. A "non-credit" student may do as much of the work of the course as he desires, but he may not take the final examination and he will not receive a grade. Full fees of $35.00 per semester hour are required in "non-credit" enrollment.

AUDIT. An auditor is entitled to listen to lectures and class discussions, but he may not participate in discussions or take examinations. Students may not enroll as auditors in laboratory courses. A student carrying a full program for credit may be given permission

to audit as many courses as he desires without additional fees. Students carrying less than a full program for credit may secure permission to audit but are required to pay the auditing fee of $17.50 per semester hour.

## *Eligibility for Course Enrollment*

Courses numbered 1-49 are primarily for freshmen, or freshmen and sophomores. Courses numbered 50-99 are ordinarily for sophomores, or sophomores and juniors. Courses numbered 100-199 are designed for juniors and seniors. Courses numbered 200-299 are planned for seniors and graduates. Courses numbered 300 up admit graduate students only. Courses numbered from 200 up are limited in enrollment to 25 students.

## *Credits Allowed in Summer*

The Summer Session courses are of the same quality and credit values as courses in the regular semester. Credit earned in the Summer Session is in terms of semester hours. The majority of Summer Session courses carry 3 semester hours' credit and require one term in residence. A limited number of basic courses in the sciences carry 4 s.h. credit (Chemistry, Geology, Physics, Zoology).

## *The Normal Course Program*

The normal and maximum program for one term of the Summer Session is 6 semester hours, except in cases where students take a 4 semester hour language course. In those cases 7 semester hours per term will be allowed. The 4 semester hour courses in the sciences run for four weeks and one such course constitutes a full course program. Four semester hour courses in the sciences do not meet on Saturdays.

## *Grading*

Only a student taking a course for credit will receive a grade. The grade given represents the quality of the work done in the course.

PASSED.

*Undergraduate Grades*
A—excellent
B—good
C—average
D—poor but passing

*Graduate Grades*
E—exceptional
G—good
S—satisfactory

FAILED. A grade of F indicates that the student has failed the course, and in order to receive credit for the course he must repeat the work in class.

INCOMPLETE. A grade of I may be reported by the instructor if for any reason he is unable to report the final grade at the regular time. Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is recorded as F, and the course must be repeated in class if the student is to receive credit for it.

ABSENT FROM FINAL EXAMINATION. The grade X indicates that the student was absent from the regularly scheduled examination. A student absent from examination, if the absence has been excused by the dean of the college or school in which he is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session, may receive an examination upon the payment of $5 to the Treasurer of the University. The instructor concerned arranges for the examination in cases where absences are excused. A student with an X grade who has not obtained a passing grade before the end of the semester following that in which the X was incurred is regarded as having failed in the course concerned and must repeat the work in class in order to receive credit. If a student's absence from an examination is not excused by the dean of the college or school in which he is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session, his grade for the course concerned is recorded as F.

## *Examinations*

Final examinations in courses are held on the last two days of each term. Final examinations for short courses which occupy the student's complete program will be held on the last day of the course. The examination dates for 1964 are:

First term: July 14-15.
Second term: August 20-21.

Courses in science for the first term have been scheduled so that their final examination will come on July 15. The science courses which begin July 17 and run for four weeks will have their final examination on August 14. The University has no provision for giving examinations *in absentia.* Students absent from examinations for valid reasons are permitted a liberal extension of time to return to the University for completion of credit.

## *Credits for Transfer*

A student desiring either graduate or undergraduate credits transferred from Duke University to his university or college as degree credit must request from the Director of the Summer Session, Duke University, a "Course Approval Form" to be completed by the student's Dean or Registrar and return to the Director of the Summer Session, Duke University.

## *Professional Credits Toward Teachers' Certificates*

Professional credits toward teachers' certificates are granted by the various state boards of education, each in accordance with its own carefully planned rules. Teachers in service, before enrolling for certification credit, should consult the rules laid down by their State Board of Education. If necessary, they should send to their State Board of Education a list of the courses in which they plan to enroll and inquire whether these will be acceptable for certification credit.

# Special Conferences and Courses

SPECIAL PROGRAMS FOR TEACHERS OF SCIENCE AND MATHEMATICS: It is anticipated that the Summer Session will offer a number of special programs at the graduate level designed specifically for high school teachers of science and mathematics. For detailed information on the programs, teachers should write Dr. Thomas Reynolds, Mathematics Department, Duke University, Durham, North Carolina.

CONFERENCE ON SCHOOL LAW: A conference on school law will be held on Duke University campus on June 16-17. The program is planned for the benefit of administrators and teachers in schools and colleges. Speakers and consultants well known in the field of school law will participate in the two-day conference.

CONFERENCE ON ELEMENTARY EDUCATION: JUNE 11-12, 1964. This conference is the tenth of a series of conferences dealing with various areas of learning in the elementary school. The areas of learning to be considered in this conference will be health education and physical education. Dr. Ruth Evans, a recognized authority in her

profession, will be the consultant and main speaker in the field of physical education. Mrs. Joanne Rae McGhee, a specialist in creative movement for children, will conduct a lecture-demonstration using a group of elementary school children. There will also be a specialist who will serve as consultant in the health education area. For further information write to the Director of the Summer Session, Duke University, Durham, North Carolina.

EARTH SCIENCE WORKSHOP FOR ELEMENTARY TEACHERS: The Duke University Summer Session, with the cooperation of the Duke University Geology Department and the North Carolina State Department of Public Instruction, will offer a five-day workshop in earth science for elementary teachers on June 8-12.

The workshop will be instructional with emphasis on the identification, nature, and origin of minerals and rocks. Special field trips will be conducted in Durham and adjacent counties.

The opening class will be 1:30 p.m. on June 8, thereafter lecture sessions will be from 8:30 to 11:30 a.m. and laboratory sessions from 1:30 to 4:30 p.m. The workshop will terminate at 11:30 a.m. on June 12.

Enrollment is limited to North Carolina public school teachers. No previous training in geology is required.

Teachers who participate in this workshop will not be charged tuition or registration fees.

CONFERENCE ON MODERN MATHEMATICS FOR SEVENTH AND EIGHTH GRADE TEACHERS, JUNE 15-19: The conference on "Modern Mathematics" for seventh and eighth grade teachers, co-sponsored by the North Carolina State Department of Public Instruction and Duke University, will be held on the Duke Campus from June 15 to June 19. This conference will be content oriented. There are no tuition or registration fees. Since enrollment will be limited, teachers interested should register early. Address all correspondence to the Director of the Summer Session, Duke University, Durham, North Carolina.

SUMMER INSTITUTE IN ENGLISH: The Department of English in conjunction with the North Carolina State Department of Public Instruction will offer during Term I (June 10-July 15) an Institute for teachers of English in the secondary schools. The Institute will include instruction in Literature under Professor Grover Smith and in Linguistics under Professor Holger Nygard, with each teacher including instruction also in Composition. The Institute will follow the general plan of the Institute offered in the summer of 1962 in conjunction with the Commission on English of the College Entrance Examination Board. The syllabi prepared under the supervision of

the Commission on English will be employed. The instruction will carry graduate credit which may be applied to a degree program here or elsewhere. The Institute will be limited to about thirty teachers, all of whom will receive full tuition scholarships. For further information write: Director, Summer Session, Duke University, Durham, North Carolina.

CONFERENCE OF THE NORTH CAROLINA ENGLISH TEACHER'S ASSOCIATION: The English Institute of the North Carolina English Teacher's Association will be held on the campuses of Duke University and the University of North Carolina during the Summer Session. Dates will be announced later. For further information write Professor F. E. Bowman, Department of English, Duke University.

SUMMER CENTER ON SOUTHERN ASIA: Duke University has concluded a contract with the United States Office of Education under the provisions of Title VI of the National Defense Education Act for the establishment at the University of a summer center for the intensive study of Hindi and Urdu and cognate courses. This program is part of the University's Program in Comparative Studies on Southern Asia, which is also supported in part by the Office of Education. During the two summer sessions, both Intensive Elementary Hindi-Urdu and Intensive Intermediate Hindi-Urdu will be offered. In addition, courses relating to Southern Asia will be offered in sociology-anthropology and political science, which will be open to both graduate and undergraduate students. Mr. Robert O. Swan, Lecturer in Hindi-Urdu, is the Director of the summer center. A limited number of fellowships are available for undergraduate students taking Intermediate Hindi-Urdu. Interested persons should write to Dr. Olan Petty, Director of the Summer Session, Duke University.

HIGHLANDS BIOLOGICAL STATION: Duke University holds a subscribing instructional membership in the Highlands Biological Station at Highlands, North Carolina, on the southern edge of the Blue Ridge Mountains at an elevation of 4,118 feet. The situation and the region offer an excellent opportunity for field studies and limited laboratory work. A limited number of qualified students in Botany and Zoology may make arrangements to carry out research at this station.

MEDICAL MYCOLOGY: A month's course in Medical Mycology, under the direction of Dr. Norman F. Conant, is to be offered at Duke University School of Medicine and Duke Hospital, June 29 to July 25, 1964. The course will be offered every day in the week, except Sunday, and has been designed to insure a working knowledge of the human pathogenic fungi within the time allotted.

Emphasis will be placed on the practical aspects of the laboratory as an aid in helping establish a diagnosis of fungus infection. Insofar as possible and as patients become available, methods of collecting materials in the clinic for study and culture will be stressed. Work with patients, clinical material, cultures and laboratory animals will serve as a basis for this course. Also, an opportunity to study pathologic material, gross and microscopic, will be given those whose previous training would allow them to obtain the greatest benefit from a study of such material.

The enrollment for the course will be limited and the applications will be considered in the order in which they are received. An attempt will be made, however, to select students on the basis of their previous training and their stated need for this type of work.

A fee of $100.00 will be charged for this course, upon the completion of which a suitable certificate will be awarded. Please direct inquiries to Dr. Norman F. Conant, Professor of Microbiology, Duke University School of Medicine, Durham, North Carolina.

THE METHODIST COURSE OF STUDY SCHOOL: The sixteenth session of the short-term school for Methodist ministers taking the required Course of Study will be conducted during the period, July 13-August 7, 1964. While this school is designed primarily for Supply Pastors and other non-seminary candidates for the Methodist ministry, clergymen of any denomination may enroll. The curriculum as approved by the 1960 Methodist General Conference will be followed, which will include Studies for License to Preach, Introductory Studies and the Studies for the First, Second, Third, and Fourth Years.

In addition to class work, there is provision for daily worship in Duke Chapel and a number of special lectures and workshops. A varied program of recreation and athletics will be supervised by the University Department of Physical Education.

Registration is scheduled for July 13. Classes begin on the morning of July 14 and continue through August 7, including Saturdays. A descriptive folder giving details of the School will be ready for distribution about February 1, 1964, and copies may be procured by writing to Professor W. A. Kale, Director, Box 4353, Duke Station, Durham, N. C.

## *Divinity School Summer Clinics*

Three clinics, Preaching, Pastoral Care, and Rural Church Work will be held simultaneously, July 20-31, 1964. Costs include: Registration Fee, $10.00, Tuition, $40.00, and Board and Room. All participants are eligible for Tuition Grants. In addition, Methodist Min-

isters in North Carolina may inquire about special grants provided by agencies of the Annual Conferences to cover costs. Registration is open to ministers of all denominations. No academic credit is given

PREACHING: This is the seventh Clinic in Preaching to be held at Duke. Registration is limited to eighteen in number, preferably restricted to active ministers and chaplains who have been out of seminary five years or more. The Clinic will concern itself mainly with principles of sermon construction and delivery, giving ample opportunity for the participants to preach for critique. Matters of common concern for preachers will be discussed in plenary sessions. For registration information write to Professor Thor Hall, Director.

PASTORAL CARE: The Clinic in Pastoral Care has as its theme the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the Chaplains to the Duke Medical Center forms an integral part of the program. For registration information write to Professor Richard A. Goodling, Director.

RURAL CHURCH: The Rural Church Clinic will consist of intensive training, study, and planning in the area of the church's responsibilities in the town and country community, giving particular emphasis to the development of an indigenous leadership. For registration information write to Professor M. Wilson Nesbitt, Director.

# Graduate Study in the Summer Session

Any student who holds an A.B. or B.S. degree and who does not intend to earn an advanced degree at Duke University but who desires graduate work for professional or other reasons should apply to the Director of the Summer Session for admission as an unclassified student. Credit earned by an unclassified student will serve all usual purposes except that it will not count toward an advanced degree at Duke University.

Admission may be granted to a student who has received an A.B. or B.S. degree from an accredited institution after a four-year course of study. The undergraduate record should be well rounded and of such quality as to give evidence of real capacity for success in graduate study. A student who seeks admission should 1) secure an application blank from the Graduate School and promptly return it with the required information, 2) have mailed directly from the registrar of each college he has attended to the Dean of the Graduate School at Duke University an official transcript of all his undergraduate or graduate work, 3) have mailed to the same official at least two, and preferably three, letters of recommendation from persons best qualified to appraise his capacity for graduate study.

## *The Ph.D. and Ed.D. Degrees*

*Study for the Ph.D. Degree:* Students who are interested in working toward a Ph.D. degree should note in detail the requirements as outlined in the *Bulletin* of the Graduate School of Arts and Sciences. Requirements for the Ph.D. include one academic year of full-time residence.

*Study for the Ed.D. Degree:* Students who are interested in working toward an Ed.D. degree or for advanced certificates for principals and supervisors should consult the detailed statement in the *Bulletin* of the Graduate School of Arts and Sciences. Requests for specific information regarding residence and programs for the Ed.D. degree should be sent to the Director of Graduate Studies, Department of Education.

## *Requirements for the Master of Arts Degree*

*Language Requirements:* The candidate for the A.M. degree must have a reading knowledge of at least one foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) The language requirement may be satisfied by successfully passing an examination, officially conducted by the appropriate foreign language department at Duke University.

*Major and Minor Subjects:* As a prerequisite to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments have specific requirements for undergraduate preparation, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in the *Bulletin* of the Graduate School.

To complete the course requirements for the A.M. degree, the student must take 24 units of graduate courses, of which at least 12 must be in the major subject. Of the remaining 12 he must take 6 units of course work in a minor subject, leaving 6 units of course work to be taken in either the major or minor field, or in another field approved by the major departments and the Dean of the Graduate School. In addition to the course work, the student must present a thesis which carries a credit of 6 units. Thus, the total credit required for the A.M. degree amounts to 30 units.

*The Thesis for the Master of Arts Degree:* The thesis for the A.M. degree should demonstrate the student's ability to collect, arrange, interpret or report pertinent material on his special research problem. Although a publishable document is not required, the thesis must be written in a literate style, and should exhibit the student's competence in scholarly methods and procedures.

*Regulations and Procedures:* Students expecting to complete all requirements for a Master's degree should file with the Graduate School office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Candidates completing requirements for a Master's degree without thesis should file the same official blank *one month* prior to completion of all degree requirements. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the student's major department.

Four typewritten copies of the thesis, in the spring binders provided by the Duke University Library, must be submitted, in approved form, to the Dean of the Graduate School at least *three to five days* before the date of the thesis examination. The copies will

then be distributed to the several members of the examining committee.

*The Examining Committee and the Examination:* After consultation with the professor who has directed the thesis work, the Director of Graduate Studies in the major department appoints an examining committee composed of the director of the thesis as chairman and two other members of the graduate faculty, one of whom should represent the minor department. The committee composition is subject to approval by the Dean of the Graduate School. The candidate appears before this committee for an examination, which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies to this fact by signing the title page of the ribbon copy and first carbon copy of the thesis. The candidate then returns the original and first carbon copy of the thesis to the Dean of the Graduate School for binding and deposit in the University Library.

## *Requirements for the Master of Education Degree*

*Prerequisites:* The degree of Master of Education is granted ordinarily only to teachers or to others engaged in educational work.

Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

*Requirements for the Degree:* The M.Ed. degree may be earned either with or without the presentation of a thesis.

*Without Thesis:* The required work includes a departmental major (Elementary Education, Administration, Counseling, or Secondary Education) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. Permission to take such examination must be obtained from the Director of Graduate Studies of the Department of Education, and a notice of intention must be filed with him *at least two weeks* before the announced dates of the examination.

*With Thesis:* Students who elect this plan are permitted to substitute a thesis for 6 units of the required course work. The thesis subject must be approved by the professor who is to direct it and by the Director of Graduate Studies. Students expecting to complete

all requirements for a Master of Education degree should file with the Graduate School Office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the Department of Education.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside the Department of Education. The remaining 6 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

The regulations concerning the writing and submission of the thesis, and the examination of it, are the same as those governing the thesis for the Master of Arts degree.

## *The Master of Arts in Teaching Degree*

*Prerequisites:* The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. In the event that a student wishes to undertake a graduate major different from the undergraduate major, the prerequisites may be modified upon the recommendation of the student's committee and the approval of the Dean of the Graduate School.

*Programs for the Degree:* One of two programs may be arranged, in consultation with the student's committee:

A. A major in Education of 18 to 24 units and 6 to 12 units in courses outside the Department of Education.

B. A major in a department other than Education of 18 to 24 units and 6 to 12 units in Education.

In both programs a minimum of 30 units is required.

The non-education courses are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units

required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations concerning the writing and submission of the thesis, and the examination on it, are the same as those governing the thesis for the Master of Arts degree.

Candidates for the Master of Arts in Teaching who have not had teaching experience must major in Education and are required to take Education 215 (or 315) and 216, in which case a minimum of 36 units is required.

*The Committee:* Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in his major department, to plan his program of study.

This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another department. The chairman of the committee will normally be chosen from the department of the major.

## *Cooperative Program in Teacher Education*

Forty selected graduates of liberal arts colleges who desire to prepare for high school teaching will be admitted to a special internship program at Duke University. This program is designed to prepare for a teaching career selected college graduates who did not qualify professionally for teacher certification as undergraduates. The Cooperative Program provides, for candidates who are chosen, graduate study in their special fields, professional courses, and carefully supervised observation and teaching experience. One who completes the program successfully can achieve within a period of fifteen months a year of teaching experience, a Master of Arts in Teaching degree, and full certification as a teacher.

Candidates will begin the program at the opening of the Summer Session of 1964 and complete it in August of 1965. They will spend the summer preceding and the summer following the year of teaching in residence at the University. During the school year 1964-1965 interns will be employed as regular teachers in a cooperating public school system. During this year they will receive full salary and will work under the joint supervision of the cooperating public school and the University. The program will meet training qualifications for the advanced, or graduate, teacher's certificate in many states.

The salary for the year of teaching will, in effect, constitute a substantial award to candidates selected for the program. Interns will benefit from Duke University's special tuition rate for teachers. Applicants will be considered, as are candidates for other awards, on a competitive basis. The best-qualified applicants will be chosen on

the basis of undergraduate record, recommendations, and evidence of interest in becoming high-school teachers. Applicants are required to arrange interviews in connection with their applications. Application forms may be secured by addressing a request to the Dean of the Graduate School and must be submitted before February 15, 1964. Details concerning the program can be obtained by writing the Director, Cooperative Program in Teacher Education, Department of Education, Duke University.

## *Requirements for the Master of Science Degree*

*Prerequisites:* The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours' work in the major field.

*Foreign Language:* There is no foreign language requirement for this degree.

*Major and Minor Subjects:* The work for the Master of Science degree is designed to provide a broad basic foundation in the science of Civil, Electrical, or Mechanical Engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major area. He must also take a minimum of 6 units of minor work outside of engineering and 6 units in the major, minor, or another approved area. In addition to these he must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

*Regulations and Procedures:* The regulations and procedures and the provisions for examination and an examination committee are the same as those for the Master of Arts degree.

## *Candidacy for the Master's Degree*

To be considered as a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T.) the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during the first period of residence, he must make passing grades on the initial 12 units of graduate courses), (2) have made a grade of "G" or "E" on at least 3 units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T. of the supervisory committee).

## *Transfer of Credits*

Under certain circumstances a maximum credit in a Master's degree program of 6 units may be allowed for graduate courses completed elsewhere. Approval for the transfer of credits will not be given until the student has spent one semester or two terms in residence. The acceptance of credit up to this amount will not reduce the minimum period of full-time registered residence at Duke University. In no case will credit be allowed for extension or correspondence courses.

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer for credit may be permitted to register for as much as 12 units for thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 semester hours of further undergraduate training or 6 semester hours of required language courses on the undergraduate level.

## *Time Limits for Completion of the Master's Degree*

The candidate for a Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of his first registration in the Graduate School. Any candidate must complete all requirements within six calender years of his first registration.

# Undergraduate Study



UNDERGRADUATES in Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two and one-half summer sessions. By attending both terms of the Summer Session it is possible for a student to earn as many as twelve semester hours of credit. Instruction of interest to undergraduates will be offered in the summer of 1964 in most of the departments and colleges.

Undergraduates from other colleges and universities may enroll for summer instruction at Duke and transfer their earned credits to their own institutions.

# School of Nursing

The programs of the School of Nursing include courses in the Summer Session. Persons desiring to enroll in courses to meet the requirements of the School of Nursing programs must be regularly enrolled students. Students who have been admitted with Advanced Standing and who may wish to make up deficiencies in the Summer Session must have courses approved by the School of Nursing. Information about required courses is published in the regular *Bulletin of the School of Nursing.* For further information write to the Dean of the School of Nursing, Hanes House, Duke University, Durham, North Carolina.

# Divinity School Studies

BACHELOR OF DIVINITY, MASTER OF THEOLOGY, AND MASTER OF RELIGIOUS EDUCATION: The degrees of Bachelor of Divinity, Master of Theology, and Master of Religious Education are administered by the faculty of the Divinity School. A limited number of courses carrying credits toward these degrees is listed in this *Bulletin* under the heading of Religion. Persons desiring credit toward one of these degrees must be regularly admitted to the Divinity School, and all courses listed for Divinity School credit must be registered and approved in the office of the Divinity School. This school publishes its own Summer Session Bulletin, a copy of which may be secured by addressing The Office of the Dean, The Divinity School, Duke Station, Durham, North Carolina.

# Courses of Instruction

## *Minimum Enrollment Required for Courses*

All courses are offered subject to minimum enrollments. The University reserves the right to withdraw undergraduate courses in which fewer than twelve students enroll, senior-graduate courses numbered 200-299 in which fewer than ten students enroll, and graduate courses and seminars numbered 300 or above in which fewer than six students enroll. In withdrawing a course, the University attempts to avoid undue hardships on students. Sometimes, therefore, courses are offered in spite of small enrollments. Courses not listed will be given when a demand develops and an instructor is available.

## *Department Officers and Regulations*

Departments offering Summer Session programs are listed alphabetically. Under each department is given the name of the chairman and the name of the director of graduate studies. Where departments have set up special regulations for admission to candidacy for the Master's degree, these are included.

### BOTANY

ASSOCIATE PROFESSOR T. W. JOHNSON, JR., CHAIRMAN—141 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); PROFESSOR W. D. BILLINGS, DIRECTOR OF GRADUATE STUDIES—142 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

Students admitted to candidacy for an advanced degree in botany should have completed a minimum of 12 semester hours of courses in botany (or biology) beyond an elementary course, and related work in biological sciences. Students who have not yet had the minimum hours, however, may enter higher courses by permission of the instructor, if he is convinced that they can carry the work for undergraduate credit, and may count such work toward hours necessary for candidacy.

FIRST TERM (Duke Campus)

225. SPECIAL PROBLEMS.—Hours to be arranged. STAFF
359. RESEARCH.—Hours to be arranged. STAFF

FIRST TERM (Duke Marine Laboratory, Beaufort, North Carolina)

225. SPECIAL PROBLEMS.—Hours to be arranged. JOHNSON
359. RESEARCH.—Hours to be arranged. JOHNSON

SECOND TERM (Duke Campus)

226. SPECIAL PROBLEMS.—Hours to be arranged. STAFF
360. RESEARCH.—Hours to be arranged. STAFF

SECOND TERM (Duke Marine Laboratory, Beaufort, North Carolina)

211. MARINE ALGAE.—Classification, taxonomy, morphology, distribution, ecology, and economic uses of marine algae; preparation of herbarium material. In addition to collection, field work will provide students an opportunity to observe associations of marine algae *in situ* by means of diving equipment, if they wish to use it. 6 s.h. HUMM

226. SPECIAL PROBLEMS.—Hours to be arranged. HUMM AND JOHNSON

360. RESEARCH.—Hours to be arranged. HUMM AND JOHNSON

## CHEMISTRY

PROFESSOR J. H. SAYLOR, CHAIRMAN—115 CHEMISTRY BUILDING (WEST CAMPUS); PROFESSOR CHARLES K. BRADSHER, DIRECTOR OF GRADUATE STUDIES—124 CHEMISTRY BUILDING (WEST CAMPUS)

All classes in Chemistry, Term I, will begin on June 16 and continue through July 15. All classes in Chemistry, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Chemistry classes will not meet on Saturdays.)

### FIRST TERM

1. GENERAL INORGANIC CHEMISTRY.—Lectures, recitations, and laboratory work on the elementary principles of chemistry and on the occurrence, preparation, properties, and uses of the elements and their compounds. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BONK

61. FUNDAMENTALS OF ANALYTICAL CHEMISTRY.—A study of the relations of electrolytes in solution and of chemical equilibrium illustrated by laboratory experiments involving the techniques of gravimetric, volumetric, and colorimetric analysis. Prerequisites: Chemistry 1-2 and Mathematics 21 or equivalent Lecture or recitation daily, 8:30-10:00; laboratory daily, 10:30-12:30 and 1:30-4:00. 4 s.h. TOREN

151. ORGANIC CHEMISTRY.—An introduction to the study of carbon compounds. Compounds of the aliphatic series form the basis of lectures, discussions and laboratory experiments. Prerequisite: Chemistry 61. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BROWN

275. THESIS RESEARCH.—Research in the fields of physical, analytical, inorganic, or organic chemistry. Open to those students whose research programs for the A.M. and Ph.D. degrees have been approved by the department and by one of the instructors in charge of the course. Schedule to be arranged. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) 2 to 8 s.h. Available Terms I and II.

### SECOND TERM

2. GENERAL INORGANIC CHEMISTRY.—A continuation of 1. Prerequisite: Chemistry 1. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. BONK

152. ORGANIC CHEMISTRY.—A study of compounds of the aromatic series and of carbohydrates and proteins. Prerequisite: Chemistry 151. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. VINGIELLO

## CLASSICAL STUDIES

PROFESSOR ROBERT S. ROGERS, CHAIRMAN AND DIRECTOR OF UNDERGRADUATE STUDIES IN LATIN—204 CARR BUILDING (EAST CAMPUS); PROFESSOR JAMES N. TRUESDALE, DIRECTOR OF UNDERGRADUATE STUDIES IN GREEK—123 ALLEN BUILDING (WEST CAMPUS)

## GREEK

### FIRST TERM

121. GREEK LITERATURE: HOMER.—*Iliad* and *Odyssey*. The purpose of this course is to give a general survey of the life and civilization of the Greeks, especially to those who have never studied the language but wish to become acquainted with some of the choicest portions of the literature by the use of translations. The *Iliad* and the *Odyssey* are read in translation, and the excavations and discoveries at Troy and other cities of the Aegean age are discussed. 7:40-9:00. 3 s.h. STANLEY

122. GREEK LITERATURE: THE TRAGIC POETS.—The purpose of this course is similar to that of course 121. Many of the extant plays of Aeschylus, Sophocles, and Euripides are studied in English translations. 9:20-10:40. 3 s.h. STANLEY

## LATIN AND ROMAN STUDIES

### FIRST TERM

63. CICERO'S ORATIONS.—Selected orations of Cicero are read with attention to prose style. Prerequisite: Latin 1-2, or equivalent. 7:40-9:00. 3 s.h. WOOLEY

64. VERGIL'S AENEID.—Selections are read and interpreted, with due attention to prosody, and discussion of the literary excellence of the work. 11:00-12:20. 3 s.h. WOOLEY

111. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selected readings of Latin literature in English translation with emphasis on the drama, lyric poetry, and the varied contributions of Cicero to literature. 9:20-10:40. 3 s.h. SETTLE

112. ROMAN LITERATURE IN ENGLISH TRANSLATION.—Selected readings of Latin literature in English translation with emphasis on the epic, the satire, and the novel. 11:00-12:20. 3 s.h. SETTLE

## COMPARATIVE LITERATURE

### FIRST TERM

205. FOUNDATIONS OF TWENTIETH-CENTURY EUROPEAN LITERATURE.—The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Lagerkvist, Camus) evolving toward a mythology of man. 9:20-10:40. 3 s.h. SALINGER

## ECONOMICS

PROFESSOR ROBERT S. SMITH, ACTING CHAIRMAN—307 SOCIAL SCIENCE BUILDING (WEST CAMPUS); PROFESSOR FREDERICK C. JOERG, DIRECTOR OF UNDERGRADUATE STUDIES—316 SOCIAL SCIENCE BUILDING (WEST CAMPUS); PROFESSOR ROBERT S. SMITH, DIRECTOR OF GRADUATE STUDIES—304 SOCIAL SCIENCE (WEST CAMPUS)

### FIRST TERM

51. PRINCIPLES OF ECONOMICS.—A course in the essential principles of economic science. (Credit for Ec. 51 will not be given until Ec. 52 has been completed.) 9:20-10:40. 3 s.h. YOHE

57. PRINCIPLES OF ACCOUNTING.—Elementary principles of single proprietorship, partnership, and corporation accounting. June 10-June 26. 7:40-12:20. 3 s.h. PETHIA

58. PRINCIPLES OF ACCOUNTING.—A continuation of Economics 57. June 27-July 15. 7:40-12:20. 3 s.h. PETHIA

143. CORPORATION FINANCE.—Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57-58, Principles of Accounting, or Economics 60, General Accounting. 9:20-10:40. 3 s.h. JOERG

153. MONEY, CREDIT AND BANKING.—This course begins with a study of the nature, characteristics, and functions of money, credit and the commercial banking system. It covers also the history of commercial banking in the United States; the foundation, organization, and functions of the Federal Reserve System; the supervision and control of commercial banks; deposit insurance; and the value of money. 11:00-12:20. 3 s.h. YOHE

181. BUSINESS LAW.—The fundamental principles of law as applied to routine business transactions. The topics presented are: contracts, agency, and negotiable instruments. 7:40-9:00. 3 s.h. JOERG

SECOND TERM

52. PRINCIPLES OF ECONOMICS.—A continuation of Economics 51. 9:20 10:40. 3 s.h. SMITH

155. LABOR PROBLEMS.—An examination of present-day labor problems followed by an intensive study of methods used by employers and workers in meeting those problems. 11:00-12:20. 3 s.h. MRS. KREPS

189. BUSINESS AND GOVERNMENT.—A survey of the public policies which most directly affect the operation of competition in the business world. The course considers the leading philosophies of public control and economic development, the validity of their presuppositions, and their influence on legislation, court decisions and administrative law. 7:40-9:00. 3 s.h. MCGEE

268. COMPETITION AND MONOPOLY.—A detailed study of the varieties of imperfectly competitive markets, the economic and legal issues which they raise, and the policy solutions which have been attempted in the United States. 9:20-10:40. 3 s.h. MCGEE

## EDUCATION

PROFESSOR WILLIAM H. CARTWRIGHT, CHAIRMAN—08D WEST DUKE BUILDING (EAST CAMPUS); PROFESSOR EDWARD C. BOLMEIER, DIRECTOR OF GRADUATE STUDIES—08B WEST DUKE BUILDING (EAST CAMPUS)

Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.

For admission to candidacy for the Master of Arts (A.M.) degree with major in Education, or for the Master of Education (M.Ed.) degree, students must, in addition to meeting the general requirements for admission to the Graduate School, meet the following specific requirements: Credit for (1) eighteen semester hours of acceptable prior work in Education and (2) twelve semester hours of acceptable prior work in a minor field. If Psychology, Sociology, Economics, or Political Science is chosen for the minor, six semester hours of work completed after entering the junior year in college will be accepted.

The degree of Master of Arts is available in the divisions of School Administration and Supervision, Secondary Education, Elementary Education, and Guidance and Counseling. Every candidate for the Master of Arts degree in the Department should elect at least twelve semester hours in one of these divisions in which he plans to write his thesis and the remainder of his work, including the six semester hours in his minor, with the approval of the proper division adviser. The degree of Master of Education is available in the divisions of School Administration and Supervision, Secondary Education, and Elementary Education. Mr. Bolmeier, Mr Hurlburt, and Mr. Stumpf are advisers to students in School Administration and Supervision; Mr. Petty, Mr. Sublett and Miss Rudisill are advisers in Elementary Education; Mr. Bolmeier, Mr Cartwright, Mr. Githens, and Mr. Shuman are advisers in Secondary Education; and Mr. Colver, Mr. Gehman, and Mr. Weitz are advisers in Guidance and Counseling. Mr. Cartwright and Mr. Hurlburt are advisers for the Master of Arts in Teaching program. Candidates for the Master of Arts, Master of Education, or Master of Arts in Teaching degree should read with special care the regulations of the Graduate School as set forth on pages 34-41.

Candidates for the Master of Arts in the field of guidance should consult the special brochure on guidance available from the Dean of the Graduate School.

It is the intention of the Department to make available to degree candidates all courses ordinarily required for certification as graduate teachers, counselors, principals and superintendents. These courses will normally be offered at least once every three years.

FIRST TERM

118. EDUCATIONAL PSYCHOLOGY.—A study of psychology of learning; individual and social development; and psychology of adjustment, as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 11:00-12:20. 3 s.h. BALLANTYNE

201. TEACHING AND SUPERVISION OF ARITHMETIC.—Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and graduation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. (June 27-July 15). 11:00-12:20 Monday-Saturday and 2:00-3:20 Monday-Friday. 3 s.h. PETTY

203. PRINCIPLES OF SCHOOL ADMINISTRATION.—The fundamental facts and procedures of school administration, an analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 9:20-10:40. 3 s.h. STUMPF

227. THE TEACHING OF GEOGRAPHY.—A study of the basic concepts, frame of reference, and curricular materials of geography in the schools. Attention will also be given to desirable methods of presentation. 9:20-10:40. 3 s.h. TUTHILL

232. SUPERVISION OF INSTRUCTION.—A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 11:00-12:20. 3 s.h. HURLBURT

239. METHODS AND PROBLEMS OF TEACHING ENGLISH IN SECONDARY SCHOOLS.—This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 9:20-10:40. 3 s.h. MISS BRIGGS

240. EDUCATIONAL AND OCCUPATIONAL INFORMATION.—A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students, through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 7:40-9:00. 3 s.h. COLVER

241. PRINCIPLES OF GUIDANCE.—An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 9:20-10:40. 3 s.h. COLVER

246. THE TEACHING OF MATHEMATICS.—This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. June 10-June 26. 11:00-12:20, Monday through Saturday and 2:00-3:20, Monday through Friday. 3 s.h. REYNOLDS

253. SCHOOL LAW.—The primary purpose of this course is to familiarize school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 7:40-9:00. 3 s.h. BOLMEIER

266. SCIENCE IN THE ELEMENTARY SCHOOL.—Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field

studies. 7:40-9:00 (plus demonstration and laboratory workshops on alternate afternoons, not including Saturdays). 3 s.h. GITHENS

276. THE TEACHING OF HIGH-SCHOOL SCIENCE.—Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 9:20-10:40 (plus demonstration and laboratory workshops on alternate afternoons, not including Saturdays). 3 s.h. GITHENS

315. SEMINAR IN SECONDARY-SCHOOL TEACHING.—Advanced-level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216.

315.1 7:40-9:00. 3 s.h. HURLBURT

315.2 7:40-9:00. 3 s.h. MISS BRIGGS

323. PUBLIC SCHOOL FINANCE.—A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 11:00-12.20. 3 s.h. MR. STUMPF

SECOND TERM

211. THE PROBLEM CHILD (also Psychology 211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. MRS. GEHMAN

217. THE PSYCHOLOGICAL PRINCIPLES OF EDUCATION.—An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 11:00-12:20. 3 s.h. GEHMAN

222. THE CURRICULUM AND MATERIALS OF THE ELEMENTARY GRADES.—A study of curriculum problems in the elementary schools. 11:00-12:20. 3 s.h. SUBLETT

225. THE TEACHING OF HISTORY AND THE SOCIAL STUDIES.—Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 9:20-10:40. 3 s.h. CARTWRIGHT

228. IMPROVEMENT OF INSTRUCTION IN THE SOCIAL STUDIES.—An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 7:40-9:00. 3 s.h. CARTWRIGHT

234. SECONDARY-SCHOOL ORGANIZATION AND ADMINISTRATION.—This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 7:40-9:00. 3 s.h. BOLMEIER

235. THE NATURE, FUNCTION, AND REORGANIZATION OF THE CURRICULUM.—Selected problems guiding the reading of students. 9:20-10:40. 3 s.h. SUBLETT

243. PERSONALITY DYNAMICS.—A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 7:40-9:00. 3 s.h. GEHMAN

258. EDUCATIONAL MEASUREMENTS.—A critical study of the principles and techniques involved in measurement in education, with opportunity for individual research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 11:00-12:20. 3 s.h. WEITZ

## ENGINEERING

PROFESSOR J. L. MERIAM, DEAN OF THE COLLEGE OF ENGINEERING
136 ENGINEERING BUILDING (WEST CAMPUS)

### FIRST TERM

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. (Three weeks, eight hours a day.) Instruction begins on June 10 and continues through June 30. 3 s.h. (See Forestry.)
ARGES

C.E. 297. THESIS RESEARCH.—A student with the proper background may carry on research under direction of the staff in one of the following fields: engineering mechanics, foundation engineering, hydraulic engineering, material science, structural engineering, or sanitary engineering. Thesis credit only. 6 units.
MEMBERS OF GRADUATE STAFF IN CIVIL ENGINEERING

E.E. 265. *ADVANCED TOPICS IN ELECTRICAL ENGINEERING.—Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

EE. 297. THESIS RESEARCH.—A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

E.E. 399. *SPECIAL READINGS IN ELECTRICAL ENGINEERING.—Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h.
MEMBERS OF GRADUATE STAFF IN ELECTRICAL ENGINEERING

M.E. 197. PROJECTS IN MECHANICAL ENGINEERING.—This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h.
STAFF

ME. 297. THESIS RESEARCH.—A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 units.
MEMBERS OF THE GRADUATE STAFF IN MECHANICAL ENGINEERING

### SECOND TERM

C.E. 298. THESIS RESEARCH. (See C.E. 297, First Term.)

E.E. 265.* (Same as First Term.)

E.E. 298. (See E.E. 297, First Term.)

E.E. 399.* (Same as First Term.)

M.E. 198. (See M.E. 197, First Term.)

M.E. 298. (See M.E. 297, First Term.)

## ENGLISH

PROFESSOR ARLIN TURNER, CHAIRMAN—311 ALLEN BUILDING (WEST CAMPUS);
PROFESSOR BENJAMIN BOYCE, DIRECTOR OF GRADUATE STUDIES—
401 ALLEN BUILDING (WEST CAMPUS)

Candidates for the Master's degree in English are expected to have had at least twelve semester hours in undergraduate courses above the sophomore level. The Department may also require additional courses if the work of the student in his first term indicates inadequate preparation.

*** Offered only upon sufficient demand; enrollment limited.**

FIRST TERM

55. REPRESENTATIVE BRITISH WRITERS.—Chaucer's Prologue to *The Canterbury Tales,* and at least two tales, Shakespeare's *I Henry IV, Hamlet,* or *King Lear,* and one other play, John Donne's poetry (selections), and Milton's *Paradise Lost* (selections) and some of the shorter poems. 7:40-9:00. 3 s.h. JONES

57. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works of Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Emily Dickinson, and Mark Twain. 9:20-10:40. 3 s.h. ANDERSON

203. CHAUCER.—The minor poems, *Troilus,* and *The Canterbury Tales.* 9:20-10:40. 3 s.h. NYGARD

233. AMERICAN LITERATURE, 1865-1920.—Selected works of representative authors: Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists. 9:20-10:40. 3 s.h. GOHDES

244. LITERARY BIOGRAPHY.—Selected works from Plutarch to Strachey with discussion of the historical development of biography, the various methods it has used, and the various theories which have been held about it. 7:40-9:00. 3 s.h. SANDERS

261. ENGLISH LITERATURE OF THE TWENTIETH CENTURY.—Representative works of leading writers in fiction, drama, and poetry. Shaw, Wells, Yeats, Synge, Conrad, Ford, Forster, Lawrence, and Huxley are included. 11:00-12:20. 3 s.h. SMITH

332. WHITMAN.—A detailed study of *Leaves of Grass* and of selected prose works. 11:00-12:20. 3 s.h. GOHDES

During the first term the Department of English, in conjunction with the North Carolina State Department of Public Instruction, will conduct a Summer Institute for teachers of English in the secondary schools. The courses in the Institute, listed below, are open to teachers selected for the Institute. For fuller information see page 30 of this *Bulletin.*

291. THE STUDY OF LITERATURE.—Analysis of the genres of literature and the application of the basic methods of critical study. Frequent assignments in writing. 9:20-10:40. 3 s.h. SMITH

292. THE STUDY OF LANGUAGE.—A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; usage; and the application of language study to composition. 7:40-9:00. 3 s.h. NYGARD

SECOND TERM

56. REPRESENTATIVE BRITISH WRITERS.—Pope's poetry (selections), Fielding's *Joseph Andrews,* Keats's *Poems and Letters,* Arnold's *Selected Poetry and Prose,* Dickens's *Great Expectations,* Joyce's *Portrait of the Artist as a Young Man,* and Eliot's poetry (selections). 7:40-9:00. 3 s.h. MOORE

58. REPRESENTATIVE AMERICAN WRITERS.—Selections and complete works of James, Frost or Robinson, Dreiser, O'Neill, Cummings, and Faulkner or Hemingway. 9:20-10:40. 3 s.h. BUDD

222. ENGLISH LITERATURE OF THE EARLY NINETEENTH CENTURY.—The British Romantic poets and prose writers, 1810-1830, with special attention to Byron, Shelley, and Keats. 9:20-10:40. 3 s.h. STEVENSON

223. ENGLISH LITERATURE OF THE LATER NINETEENTH CENTURY.—Some of the most important works of the period with special attention to Carlyle, Dickens, Thackeray, Tennyson, and Browning. 11:00-12:20. 3 s.h. STEVENSON

235. AMERICAN LITERATURE SINCE 1920.—Selected fiction from Sherwood Anderson to the present and the early Imagist school of poets. 7:40-9:00. 3 s.h. DUFFEY

239. SHAKESPEARE.—The plays and poems. 9:20-10:40. 3 s.h. WARD

322. GENRE STUDIES IN TWENTIETH CENTURY AMERICAN LITERATURE.—Formal and thematic problems posed by the fiction, poetry, or drama of this century. 11:00-12:20. 3 s.h. DUFFEY

## FORESTRY

PROFESSOR E. S. HARRAR, DEAN OF THE SCHOOL OF FORESTRY—213 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); PROFESSOR J. G. YOHO, DIRECTOR OF GRADUATE STUDIES—104 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

Organized course work in the School of Forestry during the Summer Session is limited to plane surveying, forest surveying, silvics, and forest mensuration. These courses are required of all students entering upon two years of study in technical forestry leading to the degree of Master of Forestry.

Qualified students may engage in thesis research in certain branches of forestry during the Summer Session with the approval of the instructor concerned and the Dean of the School of Forestry, or of the Director of Graduate Studies in the case of work taken through the Graduate School.

C.E. 110. PLANE SURVEYING.—Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desirable. (Three weeks, eight hours a day.) Instruction begins on June 10 and continues through June 30. 3 s.h. ARGES

150. FOREST SURVEYING AND AERIAL PHOTO INTERPRETATION.—Application of plane surveying to forest problems; practice in making boundary, topographic and cover type surveys; details of land ownership and transfer, title search, and deed description. The last two weeks are spent in the study of the principles of aerial photogrammetry and photo interpretation, and may be taken separately for two hours of credit. Prerequisites: Civil Engineering 110, Plane Surveying; or equivalent. (Three weeks, eight hours a day.) Instruction begins on July 1 and continues through July 21. 3 s.h. CHAIKEN

151. FOREST MENSURATION.—Field studies in methods of measuring content and growth of trees and forest stands; practice in timber estimating, log scaling, use of mensurational instruments, and collection of basic data. (Three weeks, eight hours a day.) Instruction begins on August 12 and continues through September 1. 3 s.h. OSBORNE

243. SILVICS.—Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Instruction begins on July 22 and continues through August 11. (Eight hours daily.) 3 s.h. WOODS

357. RESEARCH IN FORESTRY.—Open to students whose research programs for the M.F. or D.F. degree have been approved by the Dean of the School of Forestry and the instructor responsible for directing the research and whose programs for the A.M. or Ph.D. degree have been approved by the Director of Graduate Studies and the instructor in charge. (Credits and schedule to be arranged.) June 10-August 21. 2 to 12 s.h. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) (Consult courses 301-302 in Announcement of School of Forestry for letter designation of branches of forestry in which research is to be conducted.) STAFF

## GEOLOGY

PROFESSOR E. WILLARD BERRY, CHAIRMAN—019 SCIENCE BUILDING (EAST CAMPUS)

The class in Geology, Term I, will begin on June 16 and continue through July 15. The class in Geology, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Geology classes will not meet on Saturdays.)

### FIRST TERM

51. GENERAL GEOLOGY.—This course is designed to give a general view of the surface features of the earth, their origin, structure, and materials. Illustrative

materials are studied in the laboratory. Excursions may be made to neighboring points where principles of the science are studied in the field. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. June 16-July 15. 4 s.h. HERON

SECOND TERM

52. GENERAL GEOLOGY.—This course is designed to give some knowledge of the chief events of the earth's history. Excursions may be made to suitable neighboring localities. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. July 17-August 14. 4 s.h. HERON

## GERMAN

PROFESSOR HERMAN SALINGER, CHAIRMAN—301C GRAY BUILDING (WEST CAMPUS)

The work in German 2, 63 and 64 will be coordinated with listening and oral practice in the language laboratory which students in German classes will be privileged to attend. Attendance in the laboratory is not compulsory but is very strongly advised by the Staff.

FIRST TERM

2. ELEMENTARY GERMAN.—Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. Prerequisite: German 1 or equivalent. 11:00-12:20; and on Tuesdays and Fridays, 2:00-3:20. 4 s.h. SEYMOUR

63. INTERMEDIATE GERMAN.—Grammar review and composition; reading of short stories, novels, and poems. Prerequisite: German 1-2, or two units of high school German. 9:20-10:40. 3 s.h. ALT

64. INTERMEDIATE GERMAN.—Continuation of German 63. Prerequisite: German 63 which may be taken concurrently. 11:00-12:20. 3 s.h. ALT

GRADUATE READING COURSE.—An intensive course in German to develop rapidly the ability to read technical German in several fields. For graduate students only. 9:20-10:40. No degree credit. SEYMOUR

## GREEK

(See Classical Studies)

## HEALTH AND PHYSICAL EDUCATION

E. M. CAMERON, DIRECTOR, TRINITY COLLEGE AND COLLEGE OF ENGINEERING—109 GYMNASIUM (WEST CAMPUS)

FIRST TERM

PE 182. THE ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION IN SECONDARY SCHOOLS.—Presents the everyday problems that arise in the experience of the teacher of health and physical education. Open to juniors and seniors. 11:00-12:20. 3 s.h. HARRISON

PE 190. PROTECTIVE PRACTICES IN PHYSICAL EDUCATION.—Training and conditioning of athletic teams and the prevention, diagnosis, and treatment of athletic injuries. Gymnasium. 7:40-9:00. 3 s.h. CHAMBERS

## HINDUSTANI

FIRST TERM

181. INTENSIVE ELEMENTARY HINDUSTANI.—Concentration on the acquisition of conversational ability in Hindustani, with a grammar and vocabulary basic to both Hindi and Urdu. Introduction to the Devanagari script, and the reading of graded texts. 7:40-9:00; and on Mondays and Thursdays, 2:00-32:20. 4 s.h. SWAN

183. INTENSIVE INTERMEDIATE HINDUSTANI.—Four hours of classroom work, two hours of language drill. Advanced conversation in Hindustani. Reading

and Composition. Introduction to the Nastaliq script. (Prerequisite: Elementary Hindustani.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h.
SWAN AND SALVÉ

SECOND TERM

182. INTENSIVE ELEMENTARY HINDUSTANI.—(See description for 181.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h. SWAN

184. INTENSIVE INTERMEDIATE HINDUSTANI.—(See description for 183.) 7:40-9:00; and on Mondays and Thursdays, 2:00-3:20. 4 s.h. SWAN AND SALVÉ

## HISTORY

PROFESSOR RICHARD L. WATSON, JR., CHAIRMAN—235 ALLEN BUILDING (WEST CAMPUS);
PROFESSOR HAROLD T. PARKER, DIRECTOR OF GRADUATE STUDIES—
232 ALLEN BUILDING (WEST CAMPUS)

For admission to candidacy for a Master's degree in History, the student must present a total of twelve semester hours of prior work in History, of which at least six must be in American History if he plans to take his major work in that field. Candidates for the degrees of Master of Arts in Teaching are required to complete at least three hours of seminar work and are strongly urged to enroll for this work in the second term of their attendance in the Summer Session. (See courses numbered 300 or above.)

FIRST TERM

51. MODERN HISTORY, 1500-1851.—The central fact of the expansion of Europe underlies the content of the course. The chief themes are: the contest between liberty and authority in the modern state, changing economic theory and organization, and the problems of peace and war among the states, including the Western infiltration of Asia, Latin America, and Africa, and the rise of the United States as a world power. 7:40-9:00. 3 s.h. HOFFMANN

91. THE DEVELOPMENT OF AMERICAN DEMOCRACY TO 1865.—This course is a study of trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social behavior, and conflicting ideals are considered in relation to this main theme. 7:40-9:00. 3 s.h. KUEHL

141. MODERNIZATION IN CHINA AND JAPAN.—A history of the response of China and Japan to the West between 1750 and 1911, with some attention to their cultural background. 9:20-10:40. 3 s.h. GILLIN

216. THE DIPLOMATIC HISTORY OF THE UNITED STATES, 1898 TO THE PRESENT.—The emphasis is on the emergence of the United States to world power and leadership, and on those factors which have shaped its foreign policies. 9:20-10:40. 3 s.h. KUEHL

252. RECENT EUROPEAN HISTORY: EUROPE BETWEEN THE WARS, 1919-1939.—Totalitarianism in Russia, Italy, and Germany; liberal France and England in difficulties; the disintegration of the peace. 11:00-12:20. 3 s.h. HOFFMANN

289. NATIONALISM AND COMMUNISM IN MODERN CHINA AND JAPAN.—The growth of Nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 7:40-9:00. 3 s.h. GILLIN

301. SEMINAR IN HISTORICAL INVESTIGATION.—A course designed to introduce teachers, current and prospective, to the processes of historical research through investigation of particular instances. The topics selected for investigation vary with the needs and interests of each individual. 1:40-3:00 or at an hour to be arranged. 3 s.h. FERGUSON

SECOND TERM

52. MODERN HISTORY, 1851-1964.—A continuation of History 51. 7:40-9:00. 3 s.h. CELL

92. THE DEVELOPMENT OF AMERICAN DEMOCRACY, 1865 TO THE

PRESENT.—The emphasis is on the emergence of contemporary problems. 7:40-9:00. 3 s.h. BATES

162. HISTORY OF RUSSIA, 1917 TO THE PRESENT.—The history and policies of the Soviet state since the Revolution of 1917. 9:20-10:40. 3 s.h. LERNER

206. THE UNITED STATES IN THE 20TH CENTURY: SINCE WORLD WAR I. 9:20-10:40. 3 s.h. BATES

229. RECENT INTERPRETATIONS OF MODERN EUROPEAN HISTORY.—A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. 7:40-9:00. 3 s.h. ROPP

239. HISTORY OF INTERNATIONAL COMMUNISM.—The history of the international socialist and communist movement from pre-Marxist days to the present. 11:00-12:20. 3 s.h. LERNER

302. SEMINAR IN HISTORICAL INVESTIGATION.—See description of 301. 1:40-3:00 or at an hour to be arranged. 3 s.h. ROPP

## HOSPITAL ADMINISTRATION

### SECOND TERM

201. HISTORY AND DEVELOPMENT OF HOSPITALS AND OTHER HEALTH AGENCIES.—This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions; analysis of medical care organizations in the United States, and an introduction to the medical sciences and to medical terminology. 3 s.h. SMITH

## MATHEMATICS

PROFESSOR J. J. GERGEN, CHAIRMAN—134 PHYSICS BUILDING (WEST CAMPUS); ASSOCIATE PROFESSOR S. L. WARNER, DIRECTOR OF GRADUATE STUDIES—223 PHYSICS BUILDING (WEST CAMPUS)

Graduate students are invited to consult with the Director of Graduate Studies concerning their programs.

### FIRST TERM

21. INTRODUCTORY CALCULUS.—Rectangular coordinates, functions, graphs, derivatives, maxima and minima, indefinite integrals, areas. Prerequisite: two and one-half units of college preparatory mathematics. 9:20-10:40. 3 s.h. SMITH

64. INTERMEDIATE CALCULUS.—Infinite series, vectors, and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 63. NOTE: This is a three-week course beginning June 10. 7:40-9:00 and 11:00-12:20. 3 s.h. SCOVILLE

213. MODERN ALGEBRA.—Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations. 11:00-12:20. 3 s.h. SMITH

259. SOLID ANALYTIC GEOMETRY.—Spacial and n-dimensional coordinate geometry. Configuration of planes and lines, quadric surfaces, algebraic curves. 9:20-10:40. 3 s.h. STACKELBERG

### SECOND TERM

22. INTRODUCTORY CALCULUS.—Application of the definite integral to distance, volume, length, area of surface of revolution moments, centroids, work; trigonometric, logarithmic and exponential functions; methods of integration. Prerequisite: Mathematics 21. 9:20-10:40. 3 s.h. BRYSON

## MATHEMATICS AND SCIENCE INSTITUTE

Only persons who are regular participants in the Summer Science and Mathematics Institute are eligible for these courses, except by special permission from the Director of the Institute.

Botany 206. BOTANY FOR TEACHERS. 3 units (graduate).

Botany 235. INTRODUCTION TO FIELD BOTANY. 3 units (graduate).

Botany 236. FIELD BOTANY. 3 units (graduate).

Chemistry NSF 1. INORGANIC CHEMISTRY WITH REFRESHER MATHEMATICS. 3 units (undergrad.).

Chemistry 211-212. CHEMISTRY FOR TEACHERS. 6 units (graduate).

Mathematics 21-22. INTRODUCTORY CALCULUS. 6 units (undergrad.).

Mathematics 63. INTERMEDIATE CALCULUS. 3 units (undergrad.).

Mathematics 215. INTERMEDIATE ANALYSIS. 3 units (graduate).

Mathematics 211. FINITE MATHEMATICS. 3 units (graduate).

Mathematics 209. FUNDAMENTAL CONCEPTS IN ALGEBRA, ANALYSIS, AND GEOMETRY. 3 units (graduate).

Physics 231-232. PHYSICS FOR TEACHERS. 6 units (graduate).

Zoology 205. ZOOLOGY FOR TEACHERS. 3 units (graduate).

Zoology 225. INTRODUCTION TO FIELD ZOOLOGY. 3 units (graduate).

Zoology 226. FIELD ZOOLOGY. 3 units (graduate).

(These courses provide work for three groups in biology, one group in chemistry, two groups in mathematics, and one group in physics.)

## NURSING

These courses are open to nurses only, except by special permission from the Dean of the School of Nursing.

N120. PEDIATRIC NURSING.

N130. OBSTETRIC NURSING.

N140. MEDICAL NURSING.

N150. SURGICAL NURSING.

N180. PUBLIC HEALTH SCIENCES.

## PHILOSOPHY

PROFESSOR CHARLES A. BAYLIS, CHAIRMAN—212 WEST DUKE BUILDING (EAST CAMPUS); PROFESSOR PAUL WELSH, DIRECTOR OF GRADUATE STUDIES—212 WEST DUKE BUILDING (EAST CAMPUS)

### FIRST TERM

91. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 91 is concerned with (a) the nature of truth and fact, evidence, faith and knowledge; (b) the nature of the fundamental categories ultimately descriptive of the universe. 9:20-10:40. 3 s.h. PEACH

94. HISTORY OF PHILOSOPHY: ANCIENT AND MODERN.—An introduction to philosophy through the study of some of the major writings of the modern philosophers through Kant. 11:00-12:20. 3 s.h. PEACH

### SECOND TERM

91. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 91 is concerned with (a) the nature of truth and fact, evidence, faith and knowledge; (b) the nature of the fundamental categories ultimately descriptive of the universe. 9:20-10:40. 3 s.h. WELSH

92. KNOWLEDGE, FACT AND VALUE.—An introduction to philosophy through the study of some of its main problems. Philosophy 92 is concerned with the nature and ground of values, ultimate goals and moral obligation. 11:00-12:20. 3 s.h. WELSH

## PHYSICS

PROFESSOR HENRY A. FAIRBANK, CHAIRMAN—119 PHYSICS BUILDING (WEST CAMPUS)

Classes in Physics 41, Term I, will begin on June 16 and continue through July 15. Classes in Physics 42, Term II, will begin on July 17 and continue through August 14. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 20 of this *Bulletin*. (Physics classes will not meet on Saturdays.)

### FIRST TERM

41. GENERAL PHYSICS.—This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. Prerequisites: Mathematics 21, 22 or equivalent. 4 s.h. HOPKINS AND CARPENTER

353X. THESIS SEMINAR.—Students who are properly qualified may carry on research work under direction. Credits and hours to be arranged. STAFF

### SECOND TERM

42. GENERAL PHYSICS.—A continuation of Physics 41. Prerequisite: Physics 41. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. 4 s.h. HOPKINS AND CARPENTER

## POLITICAL SCIENCE

PROFESSOR ROBERT S. RANKIN, CHAIRMAN—308 LIBRARY (WEST CAMPUS);
PROFESSOR ROBERT R. WILSON, DIRECTOR OF GRADUATE STUDIES—
405 LIBRARY (WEST CAMPUS)

### FIRST TERM

61. THE AMERICAN POLITICAL SYSTEM.—An analysis of the principles and institutions of government and politics in the United States. 11:00-12:20. 3 s.h. KEARNEY

109. STATE AND LOCAL GOVERNMENT TODAY.—Problems in state, county and city government including the administration of government services such as education, public welfare, law enforcement; intergovernmental relationships; administrative reorganization; methods of popular control; and the reconstruction of state and local government so as to meet present-day needs. 7:40-9:00. 3 s.h. LEACH

183. COMPARATIVE GOVERNMENT AND POLITICS: SOUTHEAST ASIA.—An analysis of the development of government in Thailand, Vietnam, Burma, Malaya, Indonesia, Ceylon and the Philippines. Attention will be given to the Islamic, Buddhist and other indigenous cultures of these nations. (This course is a part of the Special Hindi-Urdu Program.) 9:20-10:40. 3 s.h. KEARNEY

291. PROBLEMS OF MUNICIPAL GOVERNMENT.—An analysis of problems relating to the structural system and activities of municipalities in the United States. 9:20-10:40. 3 s.h. LEACH

### SECOND TERM

62. COMPARATIVE POLITICAL SYSTEMS.—An analysis of the principles and institutions of selected foreign governments, as compared with those of the United States. 11:00-12:20. 3 s.h. MRS. CHEEK

190. CAREER PROBLEMS IN GOVERNMENT.—Principles, techniques, and problems of public service; recent approaches to the teaching of American government and to public personnel practices.

*It is designed especially for students planning to teach or to enter the government career service.* 9:20-10:40. 3 s.h. MRS. CHEEK

## PSYCHOLOGY

PROFESSOR KARL ZENER, CHAIRMAN—224 BUILDING 9; PROFESSOR NORMAN GUTTMAN, DIRECTOR OF GRADUATE STUDIES—103 BUILDING 9

Details concerning the program in studies in Psychology may be obtained from the Director of Graduate Studies in Psychology.

### FIRST TERM

91. INTRODUCTORY PSYCHOLOGY.—An introduction to the facts, principles, and problems of normal adult psychology through a study of psychological methods as applied to motivation, emotions, perception, sensation, thinking, memory, learning, individual differences, and personality.

91.1 7:40-9:00. 3 s.h. WALLER

91.2 9:20-10:40. 3 s.h. WALLER

91.3 9:20-10:40. 3 s.h. MRS. HUSE

232. PERSONALITY AND PHYSICAL HANDICAP.—Survey of the psychological factors underlying adjustment to physical disabilities, with particular stress upon personality, emotional and social attributes. Selected case studies will be used to illustrate the integration of such factors in adjusting to home, school, and hospital settings. These cases will stress the psychological factors which hinder learning and retraining procedures. Discussion will center about psychological techniques to produce more effective progress in rehabilitation. 7:40-9:00. 3 s.h. MRS. HUSE

303. RESEARCH.—Students who are properly qualified may carry on research work under direction. Hours and credit to be arranged. STAFF

### SECOND TERM

100. PERSONALITY AND SOCIAL BEHAVIOR.—A survey of basic psychological principles underlying the study of personality in relation to the social environment. Among the topics discussed are theories of personality, the process of socialization of the individual, factors influencing adjustment to the social environment, the interaction of culture and personality. 9:20-10:40. 3 s.h. CARSON

211. THE PROBLEM CHILD (Also Education 211).—Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. MRS. GEHMAN

304. RESEARCH.—Students who are properly qualified may carry on research work under direction. Hours and credit to be arranged. STAFF

## RELIGION

PROFESSOR ROBERT E. CUSHMAN, DEAN OF THE DIVINITY SCHOOL—110 DIVINITY SCHOOL (WEST CAMPUS); PROFESSOR JAMES L. PRICE, CHAIRMAN OF THE DEPARTMENT OF RELIGION—107 GRAY (WEST CAMPUS); ASSISTANT PROFESSOR W. D. WHITE, DIRECTOR OF UNDERGRADUATE STUDIES IN RELIGION—104 GRAY (WEST CAMPUS); PROFESSOR WALDO BEACH, DIRECTOR OF GRADUATE STUDIES IN RELIGION —308 DIVINITY SCHOOL (WEST CAMPUS)

## THE DEPARTMENT OF RELIGION

### FIRST TERM

51. THE ENGLISH BIBLE.—A survey of the Old Testament, similar to Religion 1 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1. 7:40-9:00. 3 s.h. OSBORN

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal per-

sons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 7:40-9:00. 3 s.h. BRADLEY

93. SURVEY OF THE WORLD'S LIVING RELIGIONS.—An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. 9:20-10:40. 3 s.h. BRADLEY

140. CHRISTIAN BELIEFS.—An introductory study of important Christian teachings concerning God, Jesus Christ, sin and salvation, etc., intended to serve as a basis for the student's evaluation of his own religious concepts. 9:20-10:40. 3 s.h. LANGFORD

149. CURRENT INTERPRETATIONS OF CHRISTIANITY.—Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 11:00-12:20. 3 s.h. OSBORN

SECOND TERM

52. THE ENGLISH BIBLE.—A survey of the New Testament, similar to Religion 2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 2. 9:20-10:40. 3 s.h. WHITE

55. THE RELIGION OF THE BIBLE.—An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 7:40-9:00. 3 s.h. DANIELS

65. JESUS: THE MAN AND HIS MESSAGE.—A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to His contemporary significance. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. 9:20-10:40. 3 s.h. DANIELS

187. RELIGIOUS VALUES IN CLASSICAL AND EUROPEAN LITERATURE.—A consideration of the religious insights, explicit and implied, in representative writings. 7:40-9:00. 3 s.h. WHITE

## THE DIVINITY SCHOOL

Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.

FIRST TERM

110 (DS). THIS LIFE AND THE AGE TO COME.—Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 11:00-12:20. 3 s.h. ROBINSON

120 (DS). FAITH AND HERESY IN DIALOGUE.—Studies in the origin and role of the Apostles, the Nicene and the Chalcedonian Creeds in their contemporary setting. 7:40-9:00. 3 s.h. GRISLIS

337 (DS). THE THEOLOGY OF MARTIN LUTHER.—A critical and comparative examination of Luther's thought. 9:20-10:40. 3 s.h. HILLERBRAND

SECOND TERM

105 (DS). STUDIES IN PAUL.—An investigation of Paul's apostolate based upon the Acts and Epistles with attention to Paul's theology as reflected in selected passages. 7:40-9:00. 3 s.h. EFIRD

153 (DS). PASTORAL LEADERSHIP IN THE LOCAL CHURCH.—A study of

the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 9:20-10:40. 3 s.h. INGRAM

190 (DS). THE CHRISTIAN CRITIQUE OF COMMUNISM.—Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 11:00-12:20. 3 s.h. LACY

## ROMANCE LANGUAGES

PROFESSOR GIFFORD DAVIS, CHAIRMAN—205 BUILDING 5; PROFESSOR C. C. CHERPACK, DIRECTOR OF GRADUATE STUDIES—310 BUILDING 5

### FRENCH

#### FIRST TERM

1. ELEMENTARY FRENCH.—Introduction to understanding, speaking, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. BRYAN

63. INTERMEDIATE FRENCH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or two years of high-school French. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. TÉTEL

97. SPOKEN FRENCH.—Intensive instruction in the spoken language: contemporary French prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: French 64. 11:00-12:20. 3 s.h. MRS. BRYAN

#### SECOND TERM

2. ELEMENTARY FRENCH.—Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. GOODE

64. INTERMEDIATE FRENCH.—Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. BUSH

211. APPROACHES TO ROMANCE LITERATURE.—An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 9:20-10:40. 3 s.h. CHERPACK

218. THE TEACHING OF ROMANCE LANGUAGES.—Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 7:40-9:00. 3 s.h. DOW

### SPANISH

#### FIRST TERM

1. ELEMENTARY SPANISH.—Introduction to understanding, speaking, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. WINECOFF

63. INTERMEDIATE SPANISH.—Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or two years of high-school Spanish. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. TORRE

#### SECOND TERM

2. ELEMENTARY SPANISH.—Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. GLENN

64. INTERMEDIATE SPANISH.—Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. MRS. DANIEL

## SOCIOLOGY AND ANTHROPOLOGY

PROFESSOR EDGAR T. THOMPSON, ACTING CHAIRMAN—275 BUILDING 9 (WEST CAMPUS); PROFESSOR ALAN C. KERCKHOFF, DIRECTOR OF GRADUATE STUDIES—271 BUILDING 9

The Department of Sociology offers graduate work leading to the A.M. and Ph.D. degrees. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. A student who is deficient in the minimum required work will be asked to take additional undergraduate courses agreed upon in conference with the Director of Graduate Studies.

Candidates for advanced degrees in Sociology usually take minor work in Psychology, Economics, Political Science, Education, History, or Religion. Detailed requirements for the minor work, and for majors in other departments who wish to present Sociology as minor work, may be obtained from the Director of Graduate Studies.

### FIRST TERM

91. INTRODUCTION TO SOCIOLOGY: CONCEPTS AND PROCEDURES.—Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. Open to freshmen. 11:00-12:20. 3 s.h. MRS. WHITRIDGE

154. THE SOCIOLOGY OF THE ARTS.—An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations and art works as they function in their social-cultural milieux. 9:20-10:40. 3 s.h. MRS. WHITRIDGE

253. SOCIAL INSTITUTIONS.—The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 9:20-10:40. 3 s.h. THOMPSON

255. RACE AND CULTURE.—A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 11:00-12:20. 3 s.h. THOMPSON

### SECOND TERM

92. INTRODUCTION TO SOCIOLOGY: SOCIOLOGICAL STUDIES.—Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 11:00-12:20. 3 s.h. ROY

230. SOCIETY AND CULTURE IN INDIA.—The basic features of Indian culture and the impact of selected technological and social changes. (This course is a part of the Special Hindi-Urdu Program.) 11:00-12:20. 3 s.h. ROWE

241. SOCIAL STRATIFICATION.—The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 9:20-10:40. 3 s.h. ROY

## ZOOLOGY

PROFESSOR EDWARD C. HORN, CHAIRMAN—227 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS); ASSOCIATE PROFESSOR H. S. ROBERTS, ACTING DIRECTOR OF GRADUATE STUDIES—044 BIOLOGICAL SCIENCES BUILDING (WEST CAMPUS)

All classes in Zoology are offered at the Duke University Marine Laboratory at Beaufort, North Carolina (Term I, June 10-July 15; Term II, July 16-August 21). Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* pages 20-23 of this *Bulletin*. For detailed instructions and further information on these offerings see the *Bulletin of Duke University Marine Laboratory*.

To undertake study toward an advanced degree in Zoology, a student should have completed an undergraduate major in Zoology or its equivalent. This normally amounts to twenty-four or more hours of course work distributed among various fields of Zoology. The department recognizes the trend in modern biology towards interdisciplinary research, and part of the Zoology requirements may be replaced by advanced work in Chemistry, Mathematics, Physics, etc.

Required work for the A.M. degree ordinarily includes twelve units of advanced course work in Zoology, six units of course work in a minor department, and an additional six units of advanced course work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of Zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and dissertation based on original work. Minor work is available in many fields, including Anatomy, Biochemistry, Botany, Chemistry, Physics, Physiology and Psychology.

FIRST TERM (Duke Campus)

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

FIRST TERM (Duke Marine Laboratory)

203. MARINE ECOLOGY.—A study of marine animals in relation to environment. Consideration of environmental factors, succession, rhythms, communities, intraspecific and interspecific relations, productivity, conservation problems, etc., concerned with animal life in the ocean. Lectures, reviews, conferences, field and laboratory work. 6 s.h. GRAY

250. PHYSIOLOGICAL ECOLOGY OF MARINE ANIMALS.—A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. VERNBERG

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

SECOND TERM (Duke Campus)

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

SECOND TERM (Duke Marine Laboratory)

214. BIOLOGICAL OCEANOGRAPHY.—Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the Research Vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 6 s.h. MENZIES

274. MARINE INVERTEBRATE ZOOLOGY.—A study of invertebrate animals that occur in the Beaufort region. A number of field trips will be made to a variety of habitats to study, collect, and classify animals in their natural environment. The structure and habits of living invertebrates, as well as their behavior under certain experimental conditions, will be studied in the laboratory. 6 s.h. BOOKHOUT

353. RESEARCH.—Hours to be arranged. 2-6 s.h. STAFF

# Alumni Organizations

GENERAL ALUMNI ASSOCIATION: The Alumni Association of Duke University is composed of the former students of Duke University and its predecessor, Trinity College. The Association has its annual dinner at Commencement, at which time the annual business meeting of the Association is held.

DUKE UNIVERSITY NATIONAL COUNCIL: The Duke University National Council is a working body for the alumni interests and maintains a constant supervision of alumni activities. It devotes its activities and efforts to advancing the welfare of Duke University by all appropriate means. Two meetings are held each year, one at Commencement and the other in the fall. The Council is composed of representatives from the various classes, local associations, students, faculty, parents, representatives at large, honorary members, officers of the General Alumni and Alumnae Associations, and representatives from the alumni and alumnae organizations of the professional schools.

GENERAL ALUMNAE ASSOCIATION: The Alumnae Association of Duke University, a division of the Duke University Alumni Association, is composed of the women graduates and former students of Duke University and its predecessor, Trinity College. The annual business meeting is held on Alumnae Day .

ALUMNAE COUNCIL: The Alumnae Council was established by the General Alumnae Association in 1925. As the working organization of the group which established it, the Council endeavors to bind more closely the alumnae and the University and to advance the interests and aims of Duke University.

THE ALUMNI OFFICE: The General Alumni Office was organized to promote the work of the local alumni and alumnae associations and to co-ordinate the various activities of the General Alumni and Alumnae Associations and the Duke University National Council and Alumnae Council. One hundred local and professional alumni associations have been formed throughout the United States.

THE ALUMNI REGISTER OF DUKE UNIVERSITY: *The Alumni Register* of Duke University is a magazine published ten months of the year by the Alumni Association in the interest of the alumni and the University. It aims to keep the alumni in touch with one another and with the University.

THE ALUMNI NEWS: *The Duke University Alumni News* is sent to all alumni four times during the year.

# Bureau of Public Information

The Bureau of Public Information is the official news agency of the University, and all University news except sports, emanates from this office. The Bureau maintains the University's relationship with the press and other communications media, and interprets the University —its faculty, its research and its academic achievements—to the public via these media.

The Bureau also maintains individual biographical files on all faculty members, students and staff, as well as files on all University departments and activities. Its files of clippings form a rich source of historical information of the Institution's life. In addition, the Bureau is a source of information for the many inquiries about Duke University which are received daily from all sections of the nation and from abroad.

# Gifts and Bequests

DUKE University derives its principal support from endowment funds and from miscellaneous gifts and grants. Permanently invested capital funds enable the University to offer to students academic and professional training at a fraction of its actual cost. The effectiveness of the University is determined to a large extent by its financial resources.

Gifts and bequests devoted to the improvement of the work of the University will be received and administered by the trustees in accordance with the desires of the donor.

GIFTS. Any kind of property, real or personal, may be the subject of a gift and only such form as is required to pass title is necessary. If the gift consists of real property, the title will be passed by deed; if it consists of cash or unregistered bonds, the gift is consummated by delivery of the property; or if stocks, by delivery of properly endorsed stock certificates. Unless restricted, the use of gifts is at the discretion of the Board of Trustees. Usually the proceeds, conservatively invested, are added to the permanent endowment of the University. The donor may, however, restrict the use of any gift and designate definitely the objects for which it shall be used. In such

cases, the transfer of property would be accomplished by a letter or other documents describing in detail the objects for which the proceeds of the gift are to be used and when accepted by the University the term or conditions set out therein become binding upon it.

BEQUESTS. Bequests may be made to the University by an appropriate clause inserted in a will by codicil to a will already drawn. The following forms will serve as appropriate clauses for wills or codicils:

GENERAL

I give (devise; if real property) and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina and located in the City and County of Durham, State of North Carolina, and its successors forever, the sum of.....dollars (or otherwise describe the gift) for the general purposes and uses of the University at the discretion of the Board of Trustees.

SPECIFIC

I give (devise; if real property) and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina and located in the City and County of Durham, State of North Carolina, or its successors forever, the sum of.....dollars (or otherwise describe gift) and direct that the income therefrom shall be used for the following purposes, viz. (here describe the use desired).

CODICIL

Having hereinbefore made my last Will and Testament dated.....
....., and being of sound mind, I hereby make, publish, and declare the following codicil thereto; (here insert clause in same form as if it had been included in body of Will). Except as hereinbefore change, I hereby ratify, confirm and republish my said last Will and Testament.

# Degrees and Honors

The following degrees were awarded June 1, 1964:

BACHELOR OF ARTS

John Alan Abernethy
Charles Fletcher Adams, Jr.
James Albert Adams
Joan Lee Adamson
William H. Akins, Jr.
William Fred Allen, Jr.
William Calvin Allsbrook, Jr.
William James Alsentzer, Jr.
Martin David Altmaier
Richard M. Altman
C. Merrill Ambler, Jr.
Harry Kemp Anderson, Jr.
Thomas Patrick Anderson
Jeffrey Mark Applestein
Howard Monroe Armfield, Jr.
Richard Ernest Arnold
William B. Arthur
Terry Fay Ashley
William Augustus Atlee, Jr.
Luther Edmund Atwater, III
Mary Adelaide Austell
George Maynard Austin
Harriet Lindsay Austin
Barbara Ann Auzat
Carol Anne Bagley
Janet Eileen Baran
May White Barbee
Dorothy Barker
John Kilbourne Barker
Zeb Elonzo Barnhardt, Jr.
Stuart George Barr
May Joan Bates
Cynthia Anne Batte
Stephen Bruce Baylin
Beatrice Aurel Beach
Robert Lawson Beasley
David Denton Bebout
William Long Belvin, Jr.
Frank White Bennett, III
John Thomas Berteau
Page Hinton Best
Anne Evans Beswick
Brent Francis Blackwelder
William Cudd Blackwelder
Richard Walter Blair
Mary Eleanor Blakely
Margaret Elaine Moss Borcherding
Ann O'Hara Maria Boswell
Gleb Gordon Bourianoff
Virginia Ruth Bowden
Dorothy Jean Bowdren
Linda Gail Bower
Samuel Alexander Boyce
Jerry Anne Boyd
Paul Thomas Bradbury
James Anderson Breazeale
Meredith Berry Brenizer
John Furman Bridgers
John Carl Brigham
Barbara Annette Brisendine
Ernest Harry Broome, Jr.
Douglas Coleman Brown
Joseph Dillon Browne, Jr.
Bonnie Jean Brueggemann
John Rupert Gunter Bryan, Jr.
James Edward Brydges, Jr.
Richard Spencer Buddington
Lawrence Reid Burdge, Jr.
Stanley Edward Burgess
Margaret Ann Burruss
Edward Barfield Butts
Joseph Brodhead Callahan
Clarissa Louise Camfield
Ernest Camp, III
Linden Kinder Cannon, III
Lydia Nelle Cantrell
Nancy Ellen Capps
Joseph Thomas Cardwell
Mary Elizabeth Carl
Richard Bruce Carlson
William Leighton Carmichael
Caroline Mathilda Carpenter
Margaret Ann Cartwright
Leonard F. Chapman, III
Maxine Lenore Chapnick
Hannon James Cheek
James Howe Cheek, III
Carol Ann Chomicz
Scott Larson Church
Beryle Lee Clark
Lawrence Anthony Clayton
Joyce Maxine Clements
Glen Austin Coan, Jr.
Sarah Elizabeth Cobb
Richard Fuller Collins, Jr.
Isabel Meekins Combs
Emily Jeanne Comer
Dale Daniel Conroy
Eugenia Cecelia Conway
Jan Rae Cook
Rosalind Yale Cooke
Thomas Winfield Cooley, Jr.
Annette Cooper
John C. Cooper, III
Langdon McIlroy Cooper
Sara Louise Cosens
Joyce Ann Cothran
Peter Van Schaick Coughlan
John Mansfield Coulter, Jr.
Lina Lucinda Courtney
Marion Walter Courtney
Frederick O. Cox
Linda Hollon Craig
Nancy Edgar Craig
Franklin Underwood Creech
John Hunter Crews
Mary Louise Crumley
Nancy Lane Dailey
Earle Gordon Dalbey, Jr.
John Dudley Dalhouse
Diana Lee Damschroder
Doreen Carol Davis
Rockwell Furman Davis
Larry Gene Dee
John Gobel DeGooyer
Richard Ervin Densmore

Eugene Everett Derryberry
John Wilson Dickhaut, Jr.
Earl Henry Diehl, Jr.
Ralph George Dillon
David Thompson Ditmars
Walter Herbert Dixon, Jr.
Mary Irene Dodd
Caroline Gwynne Dodge
Dennis William Donnelly
Donald Alexander Douglas
William Frank Douglass
Jeffrey L. Dow
Karen Elizabeth Krueger Dow
Barbara Ann Dragoon
Janet Woods Duke
Franklin Wallace Dunbar, III
Nancy Arrington Dunn
Maurice Julian Duttera, Jr.
Mary Carol Edwards
Walter Frederick Eggers, Jr.
Jenifer Louise Ellis
Michael P. Elzay
Ella Burns Ward Emlet
Susan Ellen Emlet
Charles Richard Epes
Foster Coffman Ergood
H. Michael Erisman
Kip McKinney Espy
Jeanne Etheridge
Frank Harrison Ewing, III
Lee Edward Faber
Jacqueline Fair
Muriel Gene Farmer
William Anthony Farris
Josephine Murdoch Faust
Michael Stuart Fields
Paul Andrews Finch
A. Gordon Findlay, Jr.
Robert Stephen Fleischer
Aileen Blankinship Fletcher
Harriette McGehee Frank
Herman Randolph Frank
Pamela Ann Fraser
Sandra Wayne T. Frederick
John McDowell Fultz, Jr.
Anne Freeman Galland
James Eldridge Gardner, Jr.
William Leonard Gardner
Douglas Sherwood Gates
Sara Alice Gearhart
Judith Ann Geckeler
Keith Winfield Geiger
Albert Sumner George, Jr.
Carol Ann Getz
Lynn Patricia Gilbert
Linda Lee Gillooly
Clarence Howard Glover, Jr.
Ruby Walnita Godwin
Frank Robert Goldstein
David Marshall Goodner
Michael Kenneth Gordon
Frank Benton Gray
Thomas Nickolson Gray
Judith Estes Greenleaf
David Dolliver Gregory
Richard MacPherson Gregory
Thomas H. Gregory
Judith Anderson Grigsby
Donald Anthony Grilli
Suzanne Carol Gronemeyer
George Garland Guthrie, II
Rebecca Ann Bain Haas
Jo Harriet Haley
Charles Thomas Hall
Frances Byrd Halla
Anne Watson Halsted
Yuri Thomas Hanja
Sally Ann Hansberry
Richard Wayne Hardy
Winfred Trent Harkrader, Jr.
Christopher Bertram Harris
Richard Foster Harris, III
Frank Late Harrison, Jr.
Edward Joseph Hash
Richard Alan Haskell
Baxter Morgan Haynes, Jr.
Rosemary Frances Heer
Peter Hellman
Grover C. Henderson
William Taylor Henderson
Helen Kay Herrin
George G. Herzog
Emily Allen Becton Hespenheide
Dieter Hillerbrand
Susan Lee Hinman
Stephen McQuiston Hodges
Mary Lynne Hoeser
Douglas Clark Hollman
Joan Beth Holmquist
Barbara Craig Holsinger
Gretchen Marie Holsinger
Douglas Leigh Holt, Jr.
John Sanders Holt
Jay Everett Hopkins
Charles Tracy Hoppin
Perry Alwyn Horne
Nancy Louise Horr
Janet Samonds Horton
Lewis William Wyche Horton, Jr.
Mary Lou Huck
George William Huntley, III
Susan Carole Hunyadi
Joan Hutcheson
DeForest Peter Ingersoll
Adelyn Sherrill Ivey
Charles Rankin Jackson
Marie Elaine Jacobus
Patricia Talfryn James
Theodore Wesley Jennings, Jr.
Jefferson Deems Johnson, III
Leroy Peter Johnson
Mary Jane Johnson
Robert Arnold Johnson
Windy Leigh Johnson
David Currier Jones
James Fly Jones
Pamela Louise Jones
Dorothy Susan Jordan
Gail Jordan
Patricia Brown Jordan
Susan Patricia Jordan
Michael F. Kahn
Steven Kahner
Richard Evers Katholi
Constance Katson
Lawrence Myers Katz
Marion Lee Kempner
James Madison Kennedy, III
Diane Grotz Kercher
Gary Raymond Kerchner
Harry Davidson Kerr
Roxanne Edgcomb Kershaw
Kathleen J. Kienzle
Nancy Jo Kimmerle
Elmer Richard King, Jr.
Katherine Allen Kittelle
Kristina Margaret Knapp
Judith Oakes Kneen
Adrienne Carole Kohn
John Edward Koonce, III
Elizabeth Katherine Kraus
Olivia Orme Kredel
James Roger Ladd
Suzanne Fowler Langdon
Peter Huston Laning
Otto Wood Laula
Margaret Eileen Lee
Catherine Grace Leonard
Carroll Ann Leslie
Emmett Boaz Lewis, III

Valerie Ann Lewis
Ruth Virginia Lilly
Elizabeth Louise Lime
Gordon Dexter Livermore, Jr.
Elizabeth Hughes Locke
Linda Marie Loeb
David William Long
Verna Hahn Sigmon Lomax
Grace Ione Lovelace
Mary Davidson Lucas
Alfred S. Lurey
Marshall William Lynn, Jr.
Robert Anderson MacDonald
William Fredrick Maher
Don Patrick Marchese
John Calvin Markham, III
Roy Lee Marley, Jr.
Frances Stewart Marsh
Neal William Marshall
Henry Frederick Martin, III
John de Tienne Martin
Peter Wayne Martone
Barbara LeMay Matheson
Emmett Carlysle Mathews, Jr.
Janet Allen Mathews
James Norris May
Kenneth Rogers McCullough
Juretta Creighton McFarlane
Sylvia Jean McKaig
Donald Keith McKenzie
Rebecca Ann Gould McKenzie
Lawrence Evans McLean
Dorothy Inza McQuown
Evelyn Elaine McWhorter
Thomas Hiter Melton
Steven Reid Menge
Lee Fergusson Merkel
James Melvin Miles
Elizabeth Gambill Miller
Jay Ralph Miller, Jr.
Robert Michael Miller
Robert Steven Miller
Meriel Bull Mitchell
Terence Robert Mitchell
Holly Ellen Moehlmann
Elizabeth Ann Moffat
Linda Dean Montague
Diana Bess Montgomery
Thomas George Montgomery
James Thomas Moore, Jr.
Rebecca Ann Moore
Thomas Franklin Moore, Jr.
Robert Edward Lee Morefield, III
Douglas Claude Morris
Elizabeth Carey Morris
Sheila Noël Morrissey
Sandra Sue Mosher
Judith Adele Moss
James Nicholls Mullen
James Bruce Mulligan
Jeffry V. Mullins
Frances Hilda Muth
Wallace Johnston Nabers
Beverly Ann Neblett
Gary Rohde Nelson
David Anthony Newsome
Peter Michael Nicholas
William James Nichols
Roscoe Fisher Nicholson, Jr.
Elizabeth Anne Nimnicht
Sara Carey Noblett
Harry Lee Nolan, Jr.
Pamela Nolan
James Randolph Norton
Peter Kent Nunez
Philip Case Ogden, Jr.
Mildred Gillespie Ogletree
Robert James O'Kennon, Jr.
Anita Marie Osthoff
Johanna Paetsch
Prudence Steele Painter
Margith Janice Palmer
Richard DeForest Palmiter
Mary Ann Parker
John Wallace Patterson
Laird Dean Patterson
Sheila Margaret Patton
John Edward Payne
Charles Almond Pearson, III
Andrea Jean Perham
Philip Condit Perine
James Hilliard Perry, Jr.
Donna Sue Peters
Helen Louise Pickett
Sara Hunt Pierce
Carolyn Elizabeth Pierpont
Germaine Pittman
James Wendell Plonk
Andrew Pokorny
John Toulson Porter
Eleanor Patricia Powell
Henry Davies Prange
Donald Keith Prentiss
Alice Adair Prewitt
Alma Jean Price
Polly Friend Purkerson
Charles Clark Rainey, Jr.
Herbert Thompson Raker
Mary Rast Ramseur
William Carey Ramsey
Marjorie Armstrong Randolph
Anne Lee Ransey
Richard Cobb Ranson
Andrena Elizabeth Ray
Mary Janice Ray
Frank Wannamaker Raysor, II
Larry Hollis Redmond
Jon Roger Reynolds
William Roscoe Reynolds
Louisa Spruill Riddick
Martha Cole Ridge
Chandler Robbins, III
Diana Myers Roberts
Sandra Margaret Robertson
Judith Alan Robins
Peter Alfred Robinson
Susan Robinson
William Bradford Roman, Jr.
Charles Peete Rose, Jr.
Courtney Beaman Ross, Jr.
Welby Corbett Rouse, Jr.
Jack C. Rubenstein
Rosalind Louise Rudiger
Herbert Lewis Rudoy
Stewart Rushton, Jr.
Florence June Ryan
Martha Maxwell Sader
Steven Alan Sahn
Stephen Robert Salisbury
Mariann Kirven Sanders
Morris William Sandstead, Jr.
Mary Louise Sargent
Jerry Brian Sawers
Larry B. Sawers
Daniel Joseph Scala, Jr.
Jacob Michael Patrick Schroeder
William Horace Scott
Viola Carol Sellers
Diana Victoria Shaio
Clifford George Sheldon
Alice Murrell Sheridan
Harry Livingston Shinn, Jr.
Lawrence Bruce Siegel
William Paul Silberberg
Carole Lee Simeon
Michael Sisk
Brian Edward Smith
Calvin DeFriest Smith, Jr.
Dana Gibson Smith
Donald E. Smith, Jr.

Elizabeth Ann Smith
Letitia Anne Smith
Marcia Sharon Smith
Thomas Sidney Smith
Robert Ridley Smotherman, Jr.
Sabin Tucker Snow
Wade Sommermeyer
Linda Jean Speck
Stewart Thorne Spencer, Jr.
William Sherwood Spencer
John Reynold Spruill
Kenneth Maynard Stallings
Thomas Wesley Steele
Richard Nathan Stein
Frederick Ronald Stephen
Thomas Joseph Stevens
Louise Alison Stilwell
David Stollwerk
Martha Davis Strayhorn
Thomas Harold Stubbs, II
Carol LaGrande Stuckey
John Hansell Sullivan, Jr.
Elizabeth Swain
Caroline Meade Sydnor
Charles Van Taft
Barbara Josephine Taggart
Silvio Tavernise
Ann Wharton Thayer
Vincent Anthony Thomy, Jr.
Terry Tim Thurman
Donald Ray Titus
Sammie Lou Tobin
Joseph Hampton Todd
Margery Lee Todd
Peyton Henry Todd, III
Gail Marie Tousey
William Ferber Tracy
Mary Elizabeth Trent
Rebecca Grey Trent
Nancy Jean Trimbur
John H. Trout
John A. Truesdell
William Hiram Tucker, III
David Robert Uible
William Paul Ulrich, Jr.
Merle Bradley Umstead
Mabel Stuart Upchurch
Helen Winifred Vail
John Quincy van Hettinga
Raymond Ezekiel Vickery, Jr.
Arthur B. Vieregg, Jr.
Roger Sherman Vincent
Jane M. Vintinner
Charles A. Von Canon
Anne Pritchett Wagg
Margaret Waisman
Harlan Ira Wald
Gwendolyn Johnston Waldrop
Charles David Walker
Elaine Jenkins Walker
Fielding Lewis Walker, IV
Thomas Lee Walker
William M. Walker, III
Jack Gardner Wall
Sue Daniel Wallace
Frank Reid Warder
Barbara Jane Washburn
William Samuel Watkins, Jr.
Alan Douglas Watson
Katharine Johnson Watson
Janet Marie Weaver
Winona Louise Webber
Barbara Kay Weeks
Nancy Leila Weldon
Paul Burke Wharton
Mary Erskine Wheat
Harold Neil Wheeler
John K. Whisnant, Jr.
Jane Dale White
Thomas Sherwell White
Reed Larzelere Whittle
Harriet Sharon Wilbourne
Landis Melrose Wilcox
James Glenn Wilkinson
Lillian Anne Wilkinson
A. Tennyson Williams, Jr.
Edwin Joseph Williams
Herbert Haywood Williams
James Wendel Williams
Melvin Guy Williams
Richard Gordon Williams, Jr.
John Neville Williamson
Monroe Scott Williamson
Barbara Johnson Willis
Mary Alice Willis
William Charles Winzeler
Justus Mueller Wirschnitzer, Jr.
Mary Magdalene Wolf
Mary Bryan Wooten
William F. Womble, Jr.
Susan Frances Worden
Joseph DeWitt Wright
Einar John Wulfsberg
Sue Ann Yager
Lynn Louise Yarnall
Edward Strickland Yocum, II
Tekla Ann York
Mary Cecile Zaugg
Elliott Lawrence Zide

BACHELOR OF SCIENCE

Mary Judith Adkins
Ann Lewis Alsobrook
William R. Anderson
Roger Coke Barr
Karl Theodore Benson
Jay Lynn Buckley
Diana Roberts Calverley
Samuel Leslie Combs, III
Marcus Augustine Conant
Joseph William Cook, Jr.
Fredric Jay Coplon
Margaret Mayo Cordle
John Lawton Crofts, Jr.
Luke Curtis
Amiram Daniel
Thaddeus George Dankel, Jr.
George Cecil Daul, Jr.
Madonna Ann Ellis
Richard Paul Guelcher
Alice Catherine Guerry
Stephen Samuel Hecht
Henry August Hespenheide, III
Jerry Robert Hobbs
Edward Gustav Horn
Edward Lee Keller
Grant Terrence Kien
William Frank Kinard
Susan June Klein
Beverly Self Lennard
Earl Thomas Leyrer
Barbara Hamilton Mayer
John Russell Rice
Karen Therese Rom
Peter Gregory Sarafian
John Starling Shackford
Clayton F. Smith, Jr.
Bernell Kenneth Stone
James E. Strickland
Jack Sherrill Turner
William Edward Watson
Richard D. Wells
James Clifton Whorton

Martha Elizabeth Williams
Patricia Gail Wilson
Betty P. Y. Yeh
Peter Paul Yodzis, Jr.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Robert C. Bates
Charles Richard Bowman
Stanley Christopher Brown
Russell Gilbert Eckerson, Jr.
Paul Wayne Elliott
John Buxton Gee, Jr.
Paul Clayton Gurley, Jr.
Barry Shaw Hertslet
Mahmut Esat Kadaster
Stuart Day Leland
Joseph H. Moreng, Jr.
Jonathan Nils Nilsson
James Thomas O'Kelley, Jr.
Alan E. Rimer
Warren Frank Seagreaves, Jr.
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Alfred S. Lurey
Linda Marie Loeb
Josephine Murdoch Faust

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Carol Ann Himelick Cole

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Elaine Jenkins Walker
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*Air Science Department: Distinguished Military Graduate*—Karl T. Benson
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*The Anne Flexner Memorial Award for Creative Writing*—Mariann Kirven Sanders
*Borden Undergraduate Research Award in Medicine*—Donald Graham Slaughter
*Frank L. Engel Scholarship in Endocrinology Award*—Charles Rider Roe
*Erasmus Club Prize in the Humanities*—Second Prize—Mariann Sanders
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Second Prize—Dieter Hillerbrand
*Hamilton Watch Award*—Richard William Zeren
*Industrial Press Award*—William Lee Hubbell
*Merck Index Awards*—Stephen Hecht
James Whorton
*Merck Manual Awards*—Benjamin Louis Allen, Jr.
Kenneth Lee Jones
William Robert Scott
*Milmow Prize*—Norman Alexander Culbertson
*C. V. Mosby Scholarship Awards*—David Freeman Paulson
Robert Oliver Friedel
Nathan Philip Strause, III
John Lynn Dobson
Martin Alphon Nash
*Smith Kline and French Award*—Herbert Ellis Kann, Jr.
*The Robert E. Lee Prize*—Jeffry Vincent Mullins
*The Mosley Award*—Brenda Reed
*The Florence Nightingale Plaque*—Janet Baker
*North Carolina Association of C.P.A. Medal*—William Hiram Tucker, III
*North Carolina Section of A.S.C.E. Awards*—Russell Gilbert Eckerson, Jr.
Alan Edward Rimer
*The Charles Ernest Seager Memorial Award*—Nelson Rutledge Kent
*The Walter J. Seeley Scholastic Excellence Award*—Kathleen Carol Stettler
*The George Sherrerd III Memorial Award*—Kathleen Carol Stettler
*The Willis Smith Prize*—David Lee Grigg
*Algernon Sydney Sullivan Awards*—Elizabeth G. Miller
William F. Womble, Jr.
*Trent Prize in the History of Medicine*—Nathan Philip Strause, III

## ELECTIONS TO PHI BETA KAPPA DURING 1963-64

William Howard Akins, Jr.
William R. Anderson
Jeffrey Mark Applestein
May White Barbee
Cynthia Anne Batte
Karl Theodore Benson
Brent Francis Blackwelder
William Cudd Blackwelder
Mary Eleanor Blakely
Margaret Elaine Moss Borcherding
Carol Ann Himelick Cole
Isabel Meekins Combs
Dale Daniel Conroy
Fredric Jay Coplon
Sara Louise Cosens
Joyce Ann Cothran
Nancy Edgar Craig
Fred Allen Crawford, Jr.
Norman Alexander Culbertson
Diana Lee Damschroder
Thaddeus George Dankel, Jr.
Doreen Carol Davis
Mary Carol Edwards
Susan Ellen Emlet
Josephine Murdock Faust
Herman Randolph Frank
Sandra Wayne T. Frederick
James Eldridge Gardner, Jr.
Carol Ann Getz
Stephen Samuel Hecht
Henry August Hespenheide, III
Joan B. Holmquist
Douglas Leigh Holt
Mary Jane Johnson
Edward Lee Keller
Nelson Rutledge Kent
Lewis Waynick Kenyon
Grant Terrence Kien
Nancy Jo Kimmerle
Katherine Allen Kittelle
Susan June Klein
Carroll Ann Leslie
Gordon Dexter Livermore, Jr.
Elizabeth Hughes Locke

Linda Marie Loeb
Alfred Saul Lurey
Barbara Hamilton Mayer
Roger Thomas McLean, Jr.
Dorothy Inza McQuown
Sandra Sue Mosher
Mary Ann Parker
Donna Sue Peters
David Dean Peterson
Charles William Phelan
Rebecca Sue Adams Pipkin
Miriam Josephine Quinby
Marjorie Armstrong Randolph
Anne Lee Ransey
Ronald Walter Rau
Andrena Elizabeth Ray
Frank Wannamaker Raysor, II
Louisa Spruill Riddick
Susan Robinson
John Harger Roediger
Karen Therese Rom
Mariann Kirven Sanders
Elizabeth Ann Smith
Marcia Sharon Smith
Linda Jean Speck
Kathleen Carol Stettler
Bernell Kenneth Stone
Peyton Henry Todd, III
Gail Marie Tousey
David Walter Trott
John H. Trout
William Hiram Tucker, III
Raymond Ezekiel Vickery, Jr.
Elaine Jenkins Walker
Barbara Jane Washburn
William Edward Watson
John Keenan Whisnant
James Clifton Whorton
Harriet Sharon Wilbourne
Herbert Haywood Williams
John Neville Williamson
Patricia Gail Wilson
Barbara Lynn Wishnov
Richard William Zeren

**Elections from among Ph.D. Candidates, 1963-64**

George Allen Neece
John Terrence Reynolds
John Alexander Salmond
Donald Paul Snyder
Mary Ann Wimsatt

## WOMAN'S COLLEGE

### FRESHMAN HONORS

Students listed according to average

Janet Elizabeth Gurkin
Diane Wood Grantham
Josephine T. Humphreys
Sally Johanna Overaker
Karlen Ruth Lyons
Karen Diane Volz
Catherine Jane Carlile
Dianna Lee Denton
Nancy Elinor Allison
Barbara Anne Keen
Wilhelmina M. Reuben
Carolyn McFarlane
Julia Lyn Reynolds
Frances Colclough Dick
Geraldine Ruth Cleary
Mary Kathryn Gnuse
Jane Kirby Champion
Elaine Ehrensperger
Anne Walker White
Janet E. Poppendieck
Barbara Sherry Nadel
Katharine Sutton Nix
Mary Lou Warren

### SOPHOMORE HONORS

Ingrid D. Arnold
Charlotte A. Bunch
Charleene Lance Jordan
Carolyn L. Ray
Mary E. Snyder
Jill R. Holmquist
Margaret L. Harned
Mary E. Pickering
Jacqueline R. Davis
Margaret Elizabeth Gragg
Joan F. Carew
Sarah M. Mulder
Peggy Jolene Spivey
Claudia G. Conn
Linda A. Leftwich
Sherry A. Kellett
Leslie L. Davidson
Kristen C. Nelson

### JUNIOR HONORS

Leanora Ann Dreisinger
Caroline Lewis Gram
Barbara Ruth Sears
Heather Jane Low
Mary Augusta Burckel
Jane Turney Robbins
Margaret L. Smith
Cynthia A. Gilliatt
Susan Widstrom Gamelin
Rilla L. Carter
Karen Wiman Luce
Mary Frances Williams
Margaret Ann Gilliland
Carol A. Christy
Linda K. Bemis
Nancy W. Stead
Lynn Etheridge
Clint Clarenda Jennison
Ruth Marian Sutch
Sarah Lynn Weaver
Mary Ann Plant
Benita Burton Jankel
Alice Holland Estes
Margaret K. Pauley
Judith Ann Rector
Irene Vertna Gulledge
Jane Mucke Johnson
Evelyn Jeannine Krueger
Patricia Waterman
Judith Ann Baker
Mildred Anne Lassiter
Nancy Sunderland Brown
Barbara N. Fox
Elizabeth M. Baldwin

*Junior Honors (Continued)*

Mary Bynum Martin
Martha Dillard Franck
Ann Florence Pauley
Ruth Carolyn Zlotowitz
Anne Elizabeth Davis
Barbara Joann Downing
Carol Louise Gegauff
Joyce Harrold
Susan Jane Pauly
Wendy Patricia Watson
Judy Jo Worley
Mary Caroline Heald

## TRINITY COLLEGE

### Freshman Honors

Students listed according to average

Richard Rutter Gross
Donald Allen Peck
Robert Lee Duke
John Ralph Weisner
Leslie Pearlstein
Donald Robinson Wood
Kent Westbrook Wilcox
Michael Cooperider
Louis Fairfax Owens, Jr.
Raleigh A. Shoemaker
Eric Alfred Baylin
Robert Lewis Wood
William Joseph Casey, Jr.
Donald Arthur Phillips
Joseph Richard Schwab
Sam George Stone

### Sophomore Honors

Lynn T. Gillman
Robert C. Wheland
Holcombe T. Marshall
Jon W. Stuebner
Todd M. Lieber
Robert W. Widell
Julian D. Heller
William M. Blackshear, Jr.
Frank J. Huffman, Jr.
Rodney Hammond Lusk
Russell S. Harrison, Jr.
Dexter L. Jeffords
Donald O. Parsons
John A. Palmer, Jr.
Richard K. Prim

### Junior Honors

Stanley Sidney Ward
Ernest Lloyd Dunn
Guy Anthony Bayes
Ronald James Vaughan
John Austin Ryan, Jr.
James Russell Sites
Terence Nat Reisman
Overman Randolph Rollins
Kenneth C. Bass, III
Philip P. Lader
John Weiss Harris
Samuel Maxwell Myers, Jr.
Robert David Carlitz
Noel James Kinnamon
Richard Dewey Sharpe
Albert E. Benjamin, Jr.
Thomas James Herin
Richard Dietrich Krebs
Robert Douglas Penick
Ronald Vance Shearin
Charles Denny White

## COLLEGE OF ENGINEERING

### Freshman Honors

Students listed according to average

Robert Nall Bright

### Sophomore Honors

David C. Hoaglin
Nicholas Brienza
Charles H. Rogers
James B. Urquhart, III
Jeffrey M. Brick
Lester Hill
Judith A. Grimes
Glenn N. Rupp
Craig S. Volland
Linwood A. McCullers

### Junior Honors

William Thomas Warren
Paul Frederick Brown, Jr.
Joseph Stephen Simon
William A. Simpson
Wayne T. Peterson
Edward Forrest Baird
Ralph Edward Brown

# Summary

ENROLLMENT ON THE SEMESTER BASIS 1963-1964

| *School or College* | *Fall Semester 1963* | *Spring Semester 1964* |
|---|---|---|
| TRINITY COLLEGE | | |
| Regular Students | 1,942 | 1,881 |
| Special Students | 41 | 53 |
| Total | 1,983 | 1,934 |
| COLLEGE OF ENGINEERING | | |
| Regular Students | 421 | 398 |
| Special Students | 3 | 3 |
| Total | 424 | 401 |
| WOMAN'S COLLEGE | | |
| Regular Students | 1,216 | 1,157 |
| Special Students | 37 | 35 |
| Total | 1,253 | 1,192 |
| SCHOOL OF NURSING | | |
| Regular Students | 273 | 257 |
| Special Students | 21 | 10 |
| Total | 294 | 267 |
| DIVINITY SCHOOL | | |
| Regular Students | 273 | 261 |
| Special Students | 17 | 17 |
| Total | 290 | 278 |
| SCHOOL OF FORESTRY | | |
| Regular Students | 51 | 53 |
| Special Students | 16 | 13 |
| Total | 67 | 66 |

| | | |
|---|---|---|
| SCHOOL OF LAW | | |
| Regular Students | 271 | 267 |
| Special Students | — | — |
| Total | 271 | 267 |
| GRADUATE SCHOOL OF ARTS AND SCIENCES | | |
| Regular Students | 662 | 612 |
| Special Students | 457 | 460 |
| Total | 1,119 | 1,072 |
| TOTAL ENROLLED ON SEMESTER BASIS | | |
| Regular Students | 5,109 | 4,886 |
| Special Students | 592 | 591 |
| Total | 5,701 | 5,477 |

## ENROLLMENT ON THE QUARTER BASIS 1963-1964

| | Summer Session 1963 | First Quarter 1963 | Second Quarter 1963 | Third Quarter 1964 | Fourth Quarter 1964 |
|---|---|---|---|---|---|
| MEDICAL SCHOOL | | | | | |
| Regular Student | 90 | 326 | 318 | 299 | 287 |
| Fellows | 53 | 53 | 53 | 53 | 53 |
| Interns | 59 | 59 | 59 | 59 | 59 |
| Residents | 211 | 211 | 211 | 211 | 211 |
| TOTAL ENROLLED ON QUARTER BASIS | 413 | 649 | 641 | 622 | 610 |

## MISCELLANEOUS TERMS

| COURSE | Number of Students | Length of Term | Beginning of Term |
|---|---|---|---|
| Anesthesiology | 9 | 18 mos. | Registration January |
| Dietetics | 9 | 12 mos. | Registration September |
| Hospital Administration | 19 | 24 mos. | Registration Jan. & July |
| Master of Science in Nursing | 5 | 12 mos. | Registration September |
| Pharmacy Interns | 1 | 12 mos. | Registration June |

| | | | |
|---|---|---|---|
| Physical Therapy | 14 | 15 mos. | Registration September |
| Radioisotope Technician | 3 | 3 mos. | Registration Varies |
| X-Ray Technology | 9 | 24 mos. | Registration September |

## SUMMARY: FALL AND SPRING ENROLLMENT 1963-1964

| | |
|---|---|
| Fall Enrollment | 6,350 |
| Spring Enrollment | 6,099 |

## SUMMER ENROLLMENT

| | Term I | Term II | July |
|---|---|---|---|
| Regular Students | 1,601 | 1,275 | |
| Mycology | | | 14 |

## *Government, Administration, and Instruction*

| | | |
|---|---|---|
| THE UNIVERSITY TRUSTEES | | 36 |
| TRUSTEES EMERITI | | 12 |
| EMERITI | | 49 |
| GENERAL ADMINISTRATION | | 14 |
| INSTRUCTIONAL STAFF | | 929* |
| Professors | 238 | |
| Associate Professors | 195 | |
| Assistant Professor | 213 | |
| Associates | 61 | |
| Lecturers | 4 | |
| Instructors | 75 | |
| Part-time Instructors and Graduate Tutors | 103 | |
| Visiting Professors and Lecturers | 38 | |
| Directors of Departments | 2 | |
| EDUCATIONAL ADMINISTRATION | | 22† |
| BUSINESS ADMINISTRATION | | 18‡ |
| INSTITUTIONAL ADVANCEMENT | | 30§ |
| STUDENT LIFE | | 21** |
| OTHER OFFICERS | | 51†† |
| Duke University Press | 5 | |
| Music and Art | 3 | |
| Physical Education, Trinity College | 12 | |
| House Counselors, Woman's College | 10 | |
| Food Services | 15 | |
| The University Stores | 6 | |
| THE UNIVERSITY LIBRARIES | | 88‡‡ |
| TOTAL | | 1270§§ |

* Does not include nine officers with academic rank listed with the General Administration.

† Does not include eight officers listed with the General Administration and twenty-three officers with academic rank listed with the Instructional Staff.

‡ Does not include two officers listed with the General Administration.

§ Does not include two officers listed with the General Administration.

** Does not include one officer listed with the General Administration, five officers with academic rank listed with the Instructional Staff and two officers listed with the Educational Administration.

†† Does not include one officer listed with General Administration and thirteen officers with academic rank listed with the Instructional Staff.

‡‡ Does not include four officers with academic rank listed with the Instructional Staff.

§§ Does not include duplications. An officer is counted in the first category in which his name appears.

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# Bulletin of Duke University

*Information for Prospective Students*



# Annual Bulletins

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# Bulletin of Duke University

*Information for Prospective Students*

June 1964

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# The University

Although Duke University as a corporate entity dates from 1924, its roots go back nearly a century and a quarter to the Union Institute, founded in 1838 in Randolph County. "Dedicated to the erasing of ignorance and error and to the education of responsible citizens," the Institute grew slowly for a decade. In 1859 it was formally organized as Trinity College, which laid solid foundations for the future. When the college moved to the growing city of Durham in 1892, it was able to find increased support both from the church and from individuals who were dedicated to the aims of liberal education. During the next three decades Trinity College drew to its faculty men of imagination, courage, and intellectual achievement who, in an atmosphere of academic freedom, created a notable liberal arts college.

The transition from college to university dates from James B. Duke's Indenture of Trust in 1924, through which Duke University came into being. The core of the new University was already in existence. This was Trinity College, which was joined in the ensuing years by three other undergraduate colleges, the Woman's College in 1925, the College of Engineering in 1939, and the School of Nursing in 1953. In the meantime, a number of professional schools were established as part of the total University structure. In hardly more than a generation Duke University was to attain a position of educational leadership and importance, both regionally and nationally, one of the remarkable stories in American higher education.

The undergraduate colleges exist as important parts of the University which, by modern standards, is moderate in size: they enroll about 3600 students in the total population of about 6000. Though they share the same campuses with the professional schools and many of the same facilities, and participate in the wide range of activities and educational advantages possible in a university environment, each of the colleges has its separate identity; yet each is related to the others and to the University as a whole.

From college to university the basic principles have remained constant. The University motto, *Eruditio et Religio,* reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of students the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities.

The undergraduate colleges of Duke University are concerned with developing the whole person. In classroom, libraries, laboratories, gymnasia, and sports fields, and in the Chapel and religious program, they are concerned with his growth and well being in all aspects of life: mental, moral, physical, social, and spiritual. Although the University has always been closely associated with the Methodist Church, it welcomes students of all faiths and encourages them to develop their spiritual lives in accordance with the tenets of their own creeds. The need of training for specialized professions and employments is recognized, but such training is incidental to a larger purpose. Through the variety of the subject matter, the insistence on a common core of fundamental courses, and an emphasis on a more intensive study of some selected subject, the colleges seek to give their students a knowledge and appreciation of world culture and at the same time provide a foundation for careers.

## Location

Duke University is situated in Durham, North Carolina, a city of about 80,000 population, 250 miles southwest of Washington, D.C., and 400 miles northeast of Atlanta, Georgia. From Washington, New York, and New England it may be reached by trains of the Seaboard Railroad into Raleigh and by frequent buses from there to Durham, or by air travel via Eastern Air Lines and United Lines. From the south and southwest both train and air services are available and frequent. From the Ohio Valley and the middle west frequent direct air travel is available

via Eastern Air Lines from Chicago, Detroit, Cleveland, and via Piedmont Airlines from Cincinnati and Louisville. By motor, Durham may be easily and pleasantly reached by a varied network of Federal and state highways, chiefly U. S. 15, 501, and 70, and Interstate Highway 85.

The West Campus is located on a tract of nearly 8,000 acres of rolling, wooded land on the southwest fringe of the city. The East Campus is about a mile distant, within the city, on its own campus of 110 acres. The University is an active participant in the nearby important and expanding Research Triangle of North Carolina.

## The Faculty

It is the policy of the University to secure and to maintain a faculty of high competence in both teaching ability and research activity. In times of such rapid and far-reaching changes as we live in, teachers must ever be aware of new ideas, new climates of thought, new discoveries, whether they be in the sciences, in literature, or in philosophy. Their interest in the capacity for original investigation and their contribution to the ever-developing body of human knowledge help to bring to life the materials which they teach and to communicate to the college student both the excitement and the essential significance and value of learning. This double function of the scholar-teacher tends to ensure the broadest and deepest experience available to students. All ranks in the instructional staff are assigned to the beginning as well as to advanced students.

Beyond the physical limit of the classroom many opportunities exist for those students who wish and can utilize, for their own educational purposes, informal and friendly relationships with faculty members. These may be established through the regular advisory system, through extracurricular informal discussion groups and through identity of interests.

## The Student Body

In establishing his educational trust in 1924, Mr. Duke requested that "great care and discrimination be exercised in ad-

mitting as students only those whose previous record shows a character, determination, and application evincing a wholesome and real ambition for life." Within the spirit of this request the admissions officers seek those students whose records and aptitude promise a successful college experience and "who evince a wholesome and real ambition for life." Although its physical setting is in the Southeast, about half of the student body come from other sections of the nation and from foreign countries.

The University actively seeks to enroll students from a variety of different backgrounds and experiences, students possessing some special talent evolving from a passion for learning, and students who are concerned with and about the issues of today and tomorrow. Such a broadly representative group of students, chosen on merit through a selective process, ensures a cross-section of social, economic, and religious background which provides a stimulating variety in attitudes and a consequent cosmopolitan atmosphere. Such variety itself serves an important educational purpose as provincial attitudes and prejudices erode away under the mutual respect and understanding engendered by the social and intellectual interchange possible in a large, varied student body. While high scholarship always remains an important criterion in the selection of students, it is in no instance the sole measure of a student's potential success in the colleges.

## Libraries and Laboratories

Since much of the educational work of a college is accomplished through books, excellent libraries become one of the most important elements in the college experience. Indeed, it may well be maintained that the library is the central, indispensable core of an educational institution. Early recognition of the need for great collections has enabled Duke to create a library of significant size and quality. The University library now ranks among the first 15 university libraries in the country, with collections totaling 1,592,000 books and over 3,000,000 manuscripts. In addition and as part of the main collection, there are numerous school and departmental libraries: the Woman's College library, situated in the center of the East Campus, contains 138,299 volumes and periodicals; the College of Engineering library,

31,847 specialized volumes; the Biology-Forestry, 80,338; Physics-Math, 26,277; Chemistry, 20,398 volumes.

As important as books are, they are not alone sufficient for a broad education in the modern world. Laboratories, equipment of all kinds, apparatus for teaching and research—these too are of great importance. Whether it be one of the Van de Graaff accelerators for work in nuclear physics, modern sensitive testing machinery for some phase of engineering, equipment for building new research devices on the frontiers of electronic experiment, digital computers for complicated mathematical formula, microphotographic apparatus for study of cell growth and decay, or the modern language laboratories for speech study and correction —all make their contributions to the complete education of the college student.

# Admission

New students are admitted for the academic year at the opening of school in the fall.

The size of the entering classes is approximately as follows: Trinity College, 600; Woman's College, 350; College of Engineering, 175; the School of Nursing, 95. Since five thousand candidates normally apply and enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the colleges offer. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Although there are no inflexible subject matter requirements, at least fifteen acceptable units of secondary school credit must be presented. Of these at least twelve must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board. *The Writing Sample is not considered an achievement test and will not be accepted as a substitute for any of the above mentioned tests.* Candidates applying to the College of Engineering must include the appropriate mathematics test.

While the Achievement Tests are used initially for admission, the test results may subsequently be used for course placement purposes. The student planning to continue the study of a foreign language may wish to submit the foreign language achievement test for placement purposes.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject

matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

## Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on either October 15 or February 1 of the student's senior year in secondary school. The deadline date for completing applications for October decision is September 15 and for February decision, January 1. Interested students should write to the Office of Admissions for detailed information.

## Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina—27706. A non-refundable processing fee of $10.00 must accompany the submission of the full application form.

## The School of Nursing

All correspondence and admissions matters for the School of Nursing are handled by the Dean of that school. The appropriate bulletin and information about the School of Nursing may be secured by writing to the Dean, School of Nursing, Duke University, Durham, North Carolina—27706.

## Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of

all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students will not be considered for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Office of Admissions, with a detailed account of their activities since withdrawal from college.

## Advanced Placement and Credit

In order to recognize superior preparation on the part of entering students the colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to sophomore-level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, while the Duke tests are used to decide placement only in foreign languages and mathematics. A further distinction is that only the A P Examinations may lead to credit toward graduation for the course or courses omitted. Through spohomore-level placement a student is able to broaden the base of his elective courses or the depth of his study in his field of concentration in subsequent years of his college experience.

*ADVANCED PLACEMENT COURSE CREDIT:* Any stu-

dent who has earned a score of 3 or higher on an Advanced Placement Examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of 4 or 5 the award of credit will be made automatically upon matriculation; for those presenting scores of 3 it will be determined with the approval of the University department concerned, no earlier than the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

It is recognized that many secondary schools are not engaged in the Advanced Placement Program. However, any secondary school student may after adequate preparation on his own initiative apply to the College Entrance Examination Board to take one or more of the Advanced Placement Tests. Such test results may be submitted to the dean of the college and will receive the same consideration.

# College Expenses

Each student going to college should analyze carefully his financial situation. In making such an analysis it should be recognized that the primary responsibility for defraying the cost of an education lies with the student and his family. The typical college student can depend upon some contribution from his family's current income, a proportionate share of family savings, and anticipated income from summer employment. The number of years of study, contemplated and the number of dependent children in the family should be considered in computing the funds which will be available in a particular year.

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

## Estimated Expenses for an Academic Year

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board.

Incidental expenses, clothing, and travel depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student will spend at least $400.000 annually for incidental items, including sundry clothing purchases and organizational dues. Travel costs and major expenditures would have to be added to these estimates.

The estimated necessary expenditures are as follows:

| | *Undergraduate Men* | | *Undergraduate Women* | |
|---|---|---|---|---|
| Tuition | $1,050.00* | | $1,050.00* | |
| General Fee | 187.00* | | 187.00* | |
| Room Rent | 250.00* | | 275.00* | |
| Board | 500.00 | (Cafeteria estimate) | 443.00 | (Board rate) |
| Books and Supplies | 70.00 | | 70.00 | |
| Miscellaneous Expenses | 443.00 | (Moderate estimate) | 450.00* | (Moderate estimate) |
| Totals | $2,500.00 | | $2,475.00 | |

* Although these amounts are based upon present existing charges, they are subject to change. The prospective student should contact the Office of Admissions for more current information.

It should be noted that the General Fee is a charge which represents the total of the student health, publications, athletic, library, damage, Student Union, and other fee charges.

An initial, non-refundable registration fee of $20.00 is charged all new students. This fee as well as the required $50.00 deposit is paid upon acceptance into the University. One-half of the deposit serves as a continuing room deposit for succeeding semesters, and the other half serves as a continuing reservation deposit.

Since the undergraduate colleges are residential colleges, all students except day students living at home are required to live in the residence houses. The majority of the rooms on both campuses are double rooms occupied by two students. A limited number of single occupancy rooms are available.

Dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room, where full meals and *à la carte* items are served. On the East Campus, resident undergraduate women board in dining halls at a fixed fee of $450.00 per academic year.

## Financial Aid

The colleges are interested in students of ability and ambition; the total charge should not be a deterrent to those students who are unable to defray the entire cost of their education. Assistance is made available to qualified students through awards, scholarships, loans, and grants. Extensive scholarship and loan funds, including those provided in the National Defense Education Act of 1958, provide help for about 40% of each entering class. Part-time employment in various divisions of the University often supplements this amount for the particularly needy student, or provides modest help for the student not on scholarship or loan funds. Over one thousand undergraduate students in 1963-64 received assistance totalling about $1,350,000.

Specific awards included the following:

Thirty-one Angier B. Duke Memorial Scholarships, with a value from $200 to $2400. They are awarded to men and women on a basis of merit. Though granted for one year, they are renewable from year to year so long as the student does satisfactory work.

Four W. N. Reynolds Memorial Scholarships, ranging in value up to $2400, are awarded on merit to children of employees of the R. J. Reynolds Tobacco Company, its subsidiaries and affiliates, and to residents or natives of North Carolina. They are renewable annually on the basis of satisfactory performance.

Four hundred grants-in-aid, ranging from $200 to $1,000 per year, are awarded on a basis of merit and need.

A number of National Methodists Scholarships, valued at $500 per year, are available on a basis of demonstrated need to Methodist students who have given evidence of leadership in their local Methodist Youth Fellowship Groups.

Students preparing to enter full-time religious work are eligible to supply for Christian Vocations Scholarships on the basis of need. Students approved are required to sign a note each semester for the amount of financial assistance granted to them. These notes will be cancelled upon evidence that the student has entered full-time Christian work after graduation.

Scholarships from industry, ranging in value from $200 to $2,000, are awarded to students with excellent academic records, and are renewable for each of the years of undergraduate study.

Eleven Duke University School of Nursing Scholarships, valued at $200 to $1,200 per year for a maximum tenure of two years, are awarded to young women in the entering class.

Details of all scholarships and other financial aids may be obtained from the Office of Admissions.

# Residence Houses

On the East Campus ten residence houses accommodate a student-body of somewhat over 1,100 women. Each has a standard organization, consisting of a Counselor, who is a member of the Dean's staff and who lives in the house as an adult adviser, and the student House Government committee. The latter accepts responsibility in helping provide an agreeable climate for successful dormitory life. To each house are assigned students from all four classes, about 30 places in each being reserved for freshman women.

Designed in Georgian style, the residence houses form a large part of the central quadrangle of the woman's campus. They are carefully arranged for modern dormitory living, with provision for parlors, small appointment rooms, laundry rooms, kitchenettes, and other amenities for pleasant living.

On the West Campus some 2,200 men are housed in four Quadrangles—Craven, Crowell, Few, and Kilgo, and in Wannamaker Hall. Freshmen are housed in freshman houses or in special houses with upperclassmen. In the freshman houses there are housemasters; in each cross-section and special living group there is a resident fellow. Fraternity men live in separate sections of the residence halls.

## Special Living Groups

Special living groups are available for approved undergraduate men. These are designed to bring students with a broad range of interest into a congenial group. A member of the academic community who is qualified by interest and experience to serve as mentor of the group lives with them. The aim is to provide a setting that will stimulate self-government and an intellectual program to supplement each individual's effort to develop his full potential.

*Right—Duke Chapel is the dominating structure of the West Campus.*





*Entrance to the Duke University Library, center of a complex that contains one and a half million volumes.*



*Above—a view of the undergraduate men's dormitory area.*

*Below—Front and one wing of the College of Engineering Building.*





*Above—The Alice M. Baldwin Auditorium on East Campus.*

*Below—One of the Woman's College residence houses.*



# The Curriculum

Undergraduates at Duke may pursue a course of study leading to one of the following degrees: Bachelor of Arts; Bachelor of Science; Bachelor of Science in Civil, Electrical or Mechanical Engineering; and Bachelor of Science in Nursing. The Bachelor of Arts degree is offered with major concentration in: accounting, art history, art design, botany, business administration, chemistry, economics, education, English, French, geology, Greek, German, health and physical education (women students only), history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, Spanish, Russian, sociology, and zoology. The Bachelor of Science degree is offered with major concentration in: botany, chemistry, geology, mathematics, physics, psychology, and zoology.

The requirements for the degree of Bachelor of Arts include a broad distribution of studies among representative fields of culture, concentration within a special field, and some work of the student's own choice. The Bachelor of Science degrees require a heavier concentration in science or professional subjects, but are designed to encourage the inclusion of a maximum of liberal studies. In either case, the Duke student has available courses of study that provide a basic breadth of learning in several disciplines and a deepening study of his chosen specialty.

The philosophy of Duke is that the primary and continuing function of university education is to assure maximum training and development of the intellectual power of the individual student. Basic to this is our faith in the power of a liberal education to provide a foundation for the cultivation of leadership in both the specialist and the generalist. The curriculum provides that the student acquire an acquaintanceship with his own heritage and develop tools with which to work. Having these, he may hopefully advance toward the discovery and development of his highest talents.

## Planning for the Future

Many students enter college with definite career objectives. After a period of time, however, some discover that they have lost their early interests in favor of others that appear more congenial to their aptitudes. Other students enter with only vague notions of a future career. A liberal arts course will serve all of these students, especially in the beginning years.

The student can gain more from his undergraduate college experiences if he plans his program in such a way as to achieve certain life goals and career objectives. The Bureau of Testing and Guidance provides professional counseling services designed to assist the student in clarifying life goals, selecting career objectives, evaluating talents and interests, and planning programs of study which will lead to the achievement of appropriate and realistic objectives. The Bureau is also the authorized testing center for most national testing programs which may be required for admission to graduate or professional schools, or for qualification for graduate and professional school scholarships.

## Graduate Study

Students who may look forward to entering graduate or professional schools for work leading to advanced degrees will find that a broad liberal curriculum is normally adequate background and that an excellent academic record is essential. The student should inform himself of the requirements for the particular institution which he wishes to enter so that his program can be planned accordingly.

*HONORS-MASTERS PROGRAM*

This program, which is made possible partly by a grant from the Ford Foundation's Fund for the Advancement of Education, aims at the recruitment and accelerated preparation of college and university teachers. Academically superior undergraduates are selected by the Honors-Masters Committee during the spring of their sophomore year. During the junior year, these pre-graduates are enrolled in Colloquium 101, 102; normally the pre-graduates will be candidates for graduation with distinction in their major departments. Emphasis is also placed on the acquisition of

reading knowledge of two satisfactory foreign languages prior to the beginning of graduate work. Summer school scholarships as well as a limited number of first-year graduate scholarships are available.

*LAW*

No particular course is prescribed for the pre-legal student. He will want to choose his major fields of concentration, however, from those disciplines which offer him a broad general education in various fields of thought. Among these are political science, economics, history, philosophy, sociology, psychology, and English. It is essential that the prospective lawyer be highly skilled in the use of both spoken and written English. Training in public speaking and participation in debating activities will add much to his preparation for law.

*MEDICINE AND DENTISTRY*

Students who look forward to courses in medicine or dentistry should seek early advice upon the necessary course of study for admission to the school of their choice. All medical schools require basic courses in chemistry, physics, zoology, and mathematics. Although it should be emphasized that the pre-medical student need not major in science, the non-science major should make certain that he include in his program those advanced courses beyond the basic level that his adviser deems essential. He will also find it advisable to take more than the minimum requirements in certain other areas.

*THEOLOGY AND RELIGIOUS EDUCATION*

Those students who intend to enter the ministry or to follow some other religious vocation should have a broad liberal arts background. Toward this end, they should include in their programs course work in English, literature, history, philosophy, psychology, and sociology, as well as courses in religion. A concentration in one of these fields is recommended.

*ACADEMIC-PROFESSIONAL PROGRAMS*

Students who wish to combine the liberal arts work with a beginning year of professional school study in their senior year

should investigate the academic-forestry and academic-law programs. The provisions enabling a senior to elect the work of the first year in a professional school of the University applies solely to eligible students in Trinity College or the Woman's College. This privilege of completing the combined course of the degree is available only if the student is admitted to the professional school at the close of his junior year. A student thus admitted registers as a senior in his college and as a first-year student in the professional school.

*TEACHING*

The programs in the undergraduate colleges for those who wish to teach are designed to prepare both elementary and secondary school teachers. Since certification requirements vary from state to state, early advice and counseling from the faculty of the Department of Education will be well worth while.

*ACCOUNTING*

Students who plan to qualify to take the Certified Public Accountant's examination have available a specialized program which requires, in addition to the normal minimum requirements for graduation, certain specific courses in economics and in accounting to be taken in a required sequence.

*BUSINESS*

Duke students enter business careers from a variety of academic programs. There is available a Business Administration Program which requires, in addition to the normal minimum requirements for graduation, certain courses in economics, business administration and accounting to be taken in a required sequence.

*ENGINEERING*

The College of Engineering offers programs of study leading to the Bachelor of Science degree in Civil, Electrical, and Mechanical Engineering. The engineering curriculum at Duke is built upon the sound basis of mathematics and the physical sciences, but the engineering student selects a number of courses in the liberal arts and is a member of a community with a liberal arts tradition.

Men and women planning to pursue an engineering pro-

gram should enroll as freshmen in the College of Engineering, although its freshman program is not unlike that of the other undergraduate colleges. Transfer into or out of engineering often can be accomplished with a minimum of difficulty before the beginning of the sophomore year. Students considering engineering as a possible career, regardless of the undergraduate college in which enrolled initially, should make it a point to select the appropriate mathematics and physics courses during the freshman year.

# The ROTC

Through Naval and Air Force Reserve Officers Training Corps programs the University is cooperating with the Department of Defense in providing officers for the active and reserve forces of the nation.

There are two basic programs in the Naval ROTC through which students can qualify for Naval commissions upon graduation: one, the Regular NROTC program, provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, leads to a commission in the Naval Reserve or the U.S. Marine Corps Reserve.

*The Regular Student.* Appointments are made on the basis of an annual nationwide test and selection procedure. Students selected are appointed Midshipmen, USNR, and receive four years tuition, fees, and textbooks at government expense plus retainer pay at the rate of $600 per year. The regular midshipman may take any course leading to baccalaureate or higher degree with certain exceptions, e.g., pre-medicine and medicine, pre-theological and theological, music and art. He participates in two summer training cruises aboard ship and receives aviation and amphibious indoctrination at naval shore stations during one summer. Upon graduation he receives a commission as Ensign in the Regular Navy, or Second Lieutenant in the Regular Marine Corps. The minimum period of active commissioned service is four years for regular officers.

*The Contract Student.* The contract student is selected from freshmen regularly enrolled in Duke University who desire to qualify for a commission in the Naval or Marine Corps Reserve while pursuing their normal courses of study. He has the status of a civilian who has entered into a mutual contract with the Navy and is not eligible for the benefits and retainer pay received by regular midshipmen. He is paid a subsistence allowance during his last two years in the NROTC, however, amounting currently to twenty-seven dollars a month. He goes aboard ship for

one summer training cruise, normally between his junior and senior years. Upon graduation, he is commissioned in the Naval or Marine Corps Reserve and reports for active duty. Minimum period of service for both the Navy and the Marine Corps is three years.

Both Regular and Contract midshipmen are deferred from Selective Service by virtue of their commitment to serve on active duty after graduation. The Navy furnishes necessary uniforms and equipment.

THE AIR FORCE RESERVE OFFICERS TRAINING CORPS: The unit functions as a regular department of instruction known as the Department of Air Service. It selects and trains students who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers.

For enrollment in the Basic Course (freshman and sophomore years) the student must be a male citizen of the United States; be physically qualified under standards prescribed by the Air Force; be accepted by the institution as a regularly enrolled student and must meet other stated requirements.

For enrollment in the Advanced Course (junior and senior years) the student must have successfully completed the Basic Course or have had at least one year of honorable service in the Armed Forces of the United States; must execute a written agreement with the government to complete the Advanced Course *and accept a commission in the United States Air Force Reserve,* contingent upon graduation.

Those selected for the advanced course are furnished uniforms, texts, training equipment and are paid approximately $600 for the two years of the Advanced Course. Each advanced student will attend a summer training unit, at Government expense, normally between his junior and senior year.

# Student Life

Social life within the undergraduate colleges embraces so many kinds of student relationships that only a partial impression of it can be conveyed. Students of many diverse backgrounds and experiences offer both a great variety of individuality and at the same time a desire and need for community and identification. Some of this is met by common academic requirements and experiences, yet it is fair to say that most of it is gained through extra-academic affiliations. Properly, the earliest and in some respects the strongest is the class identification. In many ways the Freshman Class is the most cohesive of the four undergraduate classes, and it is during this first year that the beginning student finds his friends and associates for his college career and makes the social affiliations which will lead him into the campus life of the coming years.

Although the campuses for men and women are geographically separated, social life and college life are essentially co-educational. Each campus has its own student government association, its own inter-social councils, its own local and individual groups. All of these meet at many points for inter-college life. Women and men jointly serve on boards and councils that are concerned more with the social side of college life than with the strictly academic.

Fraternities and sororities offer to some students benefits of a social affiliation during the years of college, but offer little of interest to many others. There are eighteen national fraternities on the West Campus: Alpha Tau Omega, Beta Theta Pi, Delta Sigma Phi, Delta Tau Delta, Kappa Alpha, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Kappa Psi, Phi Kappa Sigma, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Tau Epsilon Phi, Theta Chi, and Zeta Beta Tau. All of these occupy sections in the dormitory quadrangles that include chapter and meeting rooms. No separate dining facilities are provided for fraternities; the members board in the University dining halls. About half of the total men students join fra-

ternities, and both fraternity and non-fraternity groups contain respected and prominent members of the student body. Deferred rushing has been in effect for some years, and freshmen may not be asked to join fraternity groups until the beginning of the second semester of their first year. Rules governing the conduct of fraternity affairs are made by the Inter-fraternity Council and administered by the Judicial Board of that body.

In the Woman's College thirteen national sororities have established chapters on the campus: Alpha Chi Omega, Alpha Delta Pi, Alpha Phi, Alpha Epsilon Phi, Delta Delta Delta, Delta Gamma, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Phi Mu, Pi Beta Phi, Sigma Kappa, Zeta Tau Alpha. No separate dining facilities are available to sororities; members board along with all other students in the two dining halls on the campus. Sorority affairs are under the supervision of the Woman's Pan-Hellenic Council, which serves these organizations much as the Men's Inter-fraternity Council serves the fraternities.

In addition to the purely social fraternities, numerous national honorary societies have chapters on the campus. These include groups in economics, German, classics, education, psychology, social science, mathematics, engineering, political science, Spanish, physics, French, science, and in service, forensics, leadership, scholarship, and pre-ministerial. There are also numerous local honorary orders for both men and women in scholarship, leadership, athletics, medicine, and engineering.

## Religious Life

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

In the University Service of Worship on Sunday morning two hundred students participate by singing in the choir; at least one hundred other students aid in special ways, as ushers, collectors, and assistants in the communion services.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and five denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts, other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

Separate in organization, yet coordinated in aims, are the YWCA and YMCA, both active organizations whose many members are concerned both with social work in the community and in varied programs integrated with campus needs. From the Freshman Advisory Council to help new students at their first arrival on campus to arrangements for Parent's Week-Ends, from sponsoring vesper services and meditations to organizing panel discussions on topics of contemporary interest and significance, the two groups make their influence felt throughout the colleges.

## Music, Speech and Dramatics

Students who have developed interests in music, either as performers or spectators, will find many opportunities to indulge

their interests. Competent musicians can find artistic groups which they may join: the symphony orchestra, the chamber orchestra, the concert band, the brass ensemble, the marching band for men. All of these organizations are professionally directed, and most are devoted to the study and performance of serious music. For those who express themselves by singing, more groups are available. The Chapel Choir, composed of two hundred men and women, the Woman's and the Men's Glee Clubs, which regularly give several concerts a year, and a smaller group of trained voices, the Madrigal Singers, which emphasizes research for and performance of unusual ensemble music. English and Italian Madrigals, French Chansons, and contemporary compositions are performed *a cappella* in campus and city programs. A new group, The Chancel Singers, has been organized for a select group of sixty men and women for the performance of challenging music. Programs have included Bach, Brahms, Pergolesi, Gabrilli, and Franck. The varied musical programs offered by such strictly student groups are supplemented by the Chamber Arts Society, which brings to the campus the best chamber music ensembles from this country and abroad; by the Duke Artists' Series, which sponsors the appearance of symphony orchestras, chorale groups, individual artists, ballets; and by the Duke Student Union, which sponsors many free concerts and recitals and maintains a classical record library for student use.

Students who take pleasure and satisfaction in speech and dramatics will find stimulating outlets for their talents. The Debate Council provides qualified students a chance to develop analytical and logical thinking in formal and informal discussions and debates. The varsity debate team has for many years established an excellent record in intercollegiate debating, both regionally and nationally. The presence on the campus of WDBS, a very active college radio station, provides experience in production, business management, engineering, and sales. The station broadcasts for more than eighteen hours a day and enlists a large audience on both campuses.

Creative dramatic experience is well supplied by the Duke Players and Hoof 'N' Horn. For many years the Players have put on distinguished productions of classical and modern plays.

Using both arena style production in their own theatre, and proscenium style in the University auditorium, the organization presents three major plays every year, and a number of experimental plays and readings. Aspiring playwrights have a chance to see their own work produced. Indeed, all aspects of design, lighting, business management, writing, and acting are available to all undergraduates of the Colleges. Hoof 'N' Horn, a younger organization, directs its attention to an annual production of a musical comedy. Student writers, composers, arrangers, directors, designers, dancers, singers, and technicians cooperate to produce highly original and diverting shows.

## Publications

On every college campus student publications provide a direct and valuable opportunity for student literary expression and become thereby an adjunct to the educational process. Both men and women undergraduates find exciting and stimulating experiences working on the numerous publications issued at Duke. All publications are under the supervision of a Board composed of representatives of students, faculty, and administration. The *Archive,* a literary magazine, publishes student creative writing in fiction, poetry, essays, reviews. Throughout a long life it has maintained a high quality of literary expression, and many of its student contributors have in their maturity justified their early literary promise. The *Chronicle,* the student newspaper—"The tower of campus thought and action"—has served for more than a half century as the forum of student opinion. Published twice a week, it is consistently rated high by national college press associations. The *Chanticleer,* the yearbook, serves as a review of the school year, and records in text and pictures the individuals, organizations, and events that have academically and socially contributed to the college experience. The *Peer,* a quarterly magazine, is devoted to collegiate life and interests and contains stories of general interest, essays, and cartoons. Another quarterly, the *DukEngineer,* appears under the auspices of the students in the College of Engineering. Semi-technical in nature, it provides articles by students on new de-

velopments in the profession, news of engineering societies and their activities, and local items of interest to engineers.

## The Student Union

In addition to these, but not duplicating them, is the Student Union. Efficiently organized and directed it is dedicated to stimulate, promote, and develop the social, recreational, educational, and spiritual activities of all students. To fulfill its large purpose, the Student Union operates broad and expanding programs of many kinds. Since it is student-centered, it utilizes the talents and energy of several hundred undergraduates in affecting its programs. Housed in Flowers building, it maintains lounges, Hi-Fi record collections, game rooms and offices for student organizations. Through its many committees, the Union arranges art exhibitions, photographic displays and contests, promotes bridge clubs, arranges sings, dances, and get-togethers. It sponsors major attractions, such as plays by professional groups, distinguished speakers, and prominent musical and dance groups. Through its Educational Affairs Committee it promotes symposia on questions of general interest and importance which draw to the campus figures of national and international eminence.

## Physical Education

All undergraduate students are required to engage in some type of physical education for four semesters. For men this work consists of participation in natural, practical, physical activity for at least three one-hour periods each week. The purpose is to improve body control and strength to stimulate the development of mental and physical alertness, to establish habits of regular exercise, and to give training and experience in various kinds of recreational sports which the student can enjoy during and after college.

In addition to the required work in physical education, the student may choose, on a voluntary basis, to engage in the well-developed intramural program, which embraces a dozen sports and enlists the participation of a large percentage of the men students. In a typical year more than 2,000 students on many fraternity, dormitory and organizational teams participate in

tournaments to compete for more than fifty trophies. The program is deservedly popular because it enables every student to choose the sport he most enjoys and because students themselves serve as their own managers.

The program of the Health and Physical Education Department of the Woman's College is designed to give the women students an appreciation of the value of activity for general physical well-being, skill in one or more activities which can be enjoyed as recreation during and after college, a well-developed and well-coordinated body, and a knowledge of good posture and efficient handling of the body in everyday activities. Through individual conferences following the testing program of Freshman Week, entering students are assigned to special kinds of classwork as needed, such as swimming, posture, fundamentals of movement, rhythm, or sports. One course in dance is required of all students, and swimming is required for all who are unable to pass the swimming test. During the two years of required physical education, students elect their courses from a large number of activities including individual, dual, and team sports, aquatics, conditioning exercises, and several types of dance.

The Dance Group, the Swimming Club, and the other sports clubs of the Woman's Recreational Association give opportunities for each student to take part in the types of intramural activities most interesting to her. The swimming pool, tennis courts, bowling alleys, and other athletic equipment are available to all students for use at specified times.

In order to maintain certain hygienic standards of physical education and intramural athletics, the University has made available for all students the necessary uniforms, facilities and laundry services.

## Intercollegiate Athletics

The intercollegiate athletic program is controlled entirely by the University through the Athletic Council composed of seven members from the faculty, administration, and alumni groups. Representative freshman and varsity teams are trained in football, basketball, baseball, track, cross country, golf, soccer, lacrosse, swimming, tennis, and wrestling. Schedules are arranged

to include both the schools in the Atlantic Coast Conference, of which the University is a member, and others in the South, North, East, and Middle West. Football and basketball are always the most popular spectator sports. The less popular sports, however, have their devoted followers, and over the years many excellent teams have represented the school, and athletes of note have been developed.

## Student Health

The student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester, and in the fees charged each student in the summer quarter.

The service is under the direction of the University Physician with the cooperation of the Staff. It includes hospitalization in Duke Hospital, as deemed necessary by the Hospital staff, but limited to thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Special nursing is not covered. Students pay for board while in the hospital. Refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernias, pilonidal cysts and other elective surgery, chronic skin conditions, endocrine disturbances, etc. are not included. The cost of any necessary braces and orthopaedic appliances, as well as of special nursing, must be borne by the students, and blood used for transfusions must be paid for or replaced.

If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. Accidents or illnesses occurring during vacations or while off the campus, are not included in this service. A special commercial policy available only to regularly enrolled Duke Students furnishes complementary protection, if desired.

Advisory consultation with a psychiatrist at no expense is available to students through referral either by the Student

Health Physicians or by the Deans, but office visits for psychotherapeutic interviews cannot be included in this service.

A woman physician is in charge and a nurse in constant attendance at the Woman's College Infirmary. Women students receive ambulant care at regular office hours and patients in this Infirmary can be transferred to the Duke Hospital at any hour of the day or night. Male students receive ambulant care at the Student Health Office in the hospital during regular office hours. The emergency service and the specialist consulting services of the Hospital and Medical School are always available.

Students are given a careful physical examination upon arrival at the University. Every applicant should be re-vaccinated against smallpox within three years before admission to the University. It is urgently advised that the standard Salk vaccine routine for poliomyelitis be completed by all students and that all male undergraduates be actively immunized to tetanus by injections of toxoid.

Simple directions for procedure in reporting the student's need for medical care are contained in the Student Handbook supplied to each student upon entering.



*Students have an opportunity to hear lectures by distinguished scientists on the Duke faculty.*



*Above—After class, students gather to question their instructor concerning points in his lecture.*



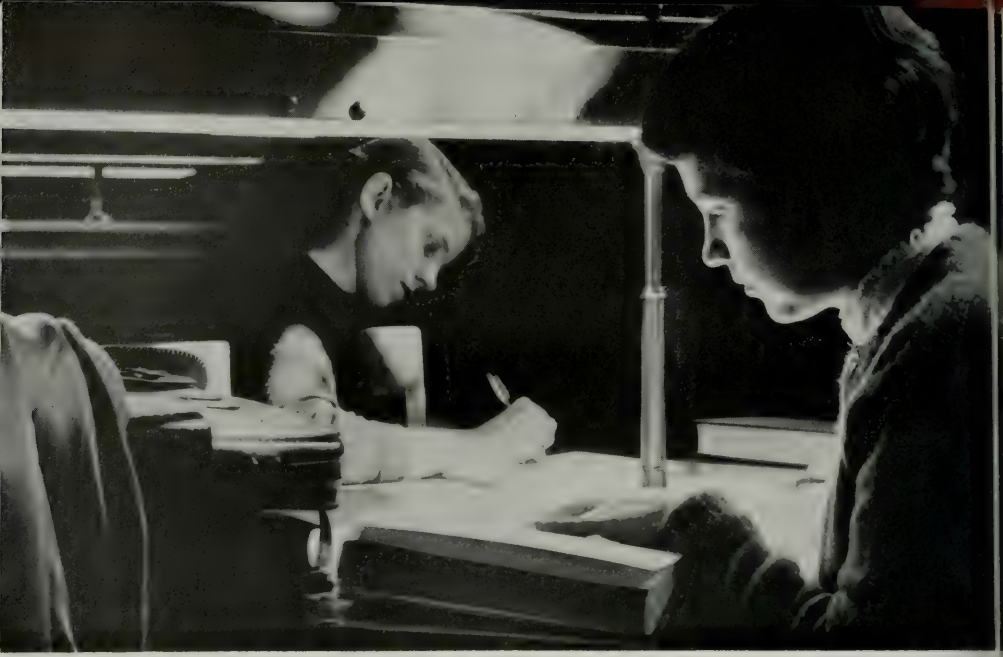
*Left—In laboratories students test the theories of scientific knowledge and develop research skills.*




*Above—Varsity athletics give color and excitement to student life.*

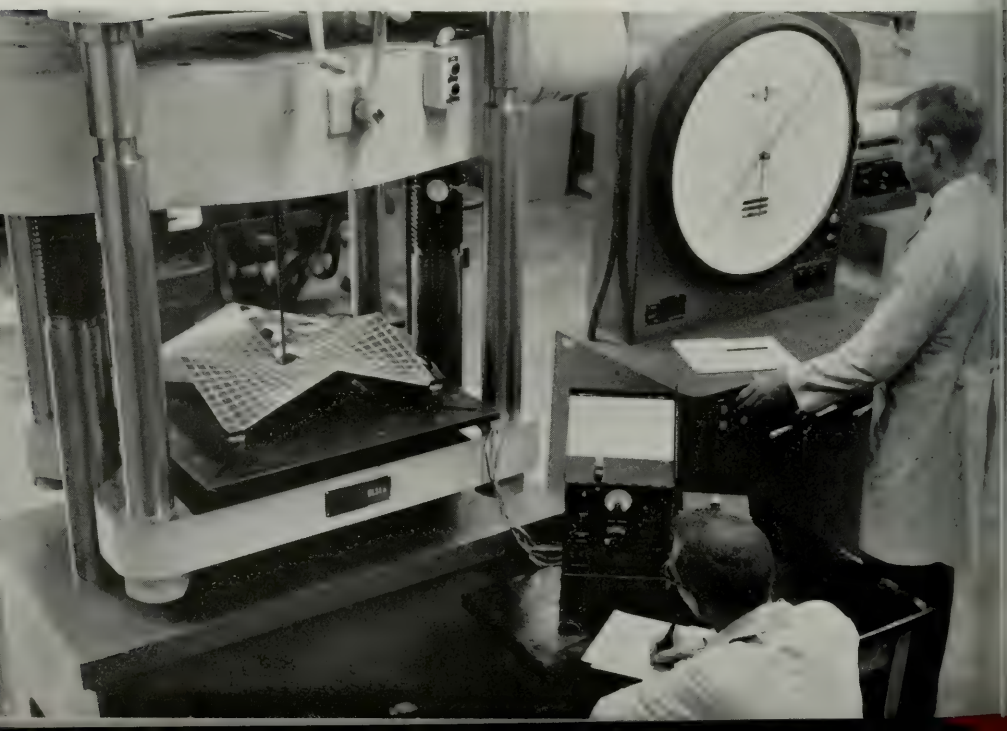
*Below—The University offers extensive opportunties for recreation and athletic participation.*





*Above—A quiet and stimulating atmosphere is found in the reading and reference rooms of the libraries.*

*Below—Engineering students put scientific principles to work in specialized laboratories.*



# General Information

*Class Attendance.* Regular and punctual attendance in class work is expected of all students. Requirements for continuation in college and for graduation emphasize the desirability of the student assuming responsibility for class attendance.

*Course Loads.* The normal program for the student in Trinity College and the Woman's College is four or five academic courses, totaling 14 to 17 hours, per semester. In the College of Engineering the normal program is 17 to 19 hours per semester.

*Grading System and Quality Credit.* Grades in courses are recorded as A, B, C, D, F. Quality points are assigned to each grade: four quality points for A, three for B, two for C, one for D, for each semester hour. Thus an A grade in a three-semester hour course would earn twelve quality points.

*Conduct.* Students are expected to cooperate in maintaining high standards of conduct. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct is not satisfactory to the University. Although direct supervision is entrusted to the Dean of Women and the Dean of Men, the respective men's and women's government associations exercise authority to investigate cases of misconduct and to make recommendations of penalties based on their findings.

*Automobiles.* Freshmen are not permitted to own or operate motor vehicles at the University. Upperclassmen are allowed to operate cars, provided they are registered and operated in accordance with University regulations. Under these conditions women in the senior class may also operate cars. A registration fee of $15.00 per semester is charged for each student-operated car.

*Bus Service.* Free bus transportation is provided by the University between and through the campuses.

# Courses

The following list of courses open to students in the undergraduate colleges is provided to suggest the range of courses available.

Courses numbered 1-49 are normally for Freshmen; those from 50-99, for sophomores; those from 99-199, for juniors and seniors; and those from 200-299, for seniors and graduate students.

Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course credit may be received for either semester without special permission.

**Air Science:**

| | |
|---|---|
| 1 | Leadership Laboratory |
| 2 | Fundamentals of Aerospace Weapon Systems |
| 51 | World Military Systems |
| 52 | Leadership Laboratory |
| 101,102 | Growth and Development of Aerospace Power |
| 203 | The Problem of Flight and Applied Air Sciences of Weather and Navigation |
| 204 | The Air Force Officer and Briefing for Commissioned Service |

Economics 152—Global Geography
Political Science 121—Elements of International Relations

**Art:**

**Aesthetics**

| | |
|---|---|
| 121 | The Principles of Art Criticism |
| 221-222 | History of Aesthetics |

**History of Art**

| | |
|---|---|
| 1-2 | Introduction to Art History |
| 51-52 | Introduction to Art History |
| 131 | Art and Archaeology of the Hellenic World |
| 132 | Roman Art and Archaeology |
| 133 | Mediaeval Architecture |
| 134 | Mediaeval Painting and Sculpture |
| 136 | Northern Renaissance Art |
| 137 | Italian Renaissance Painting and Sculpture |
| 140 | Seventeenth Century Painting and Sculpture in Europe |
| 141 | American Art |
| 143 | The History of Prints and Drawings |
| 144 | Renaissance and Baroque Architecture |
| 145-146 | The Rise of Contemporary Architecture |
| 147 | Painting and Sculpture in the Eighteenth and Nineteenth Centuries |
| 148 | Modern Painting and Sculpture |
| 149 | Pre-Columbian Art and Archaeology |
| 150 | Latin-American Art |
| 191,192 | Independent Study |
| 215 | Religious Art of the Ancient Near East |
| 216 | Religious Art of the Classical World |
| 217 | Aegean Art |
| 218 | Early Greek Art |
| 233 | Early Mediaeval Architecture |
| 234 | Romanesque Sculpture |
| 236 | Gothic Sculpture |
| 239 | Architecture of Britain |
| 240 | Architecture of North America |
| 292 | Research Problems (in the North Carolina Museum of Art) |

**Design**

| | |
|---|---|
| 1L-2L | Design Laboratory |
| 51L-52L | Design Laboratory |
| 53-54 | Beginning Studio |
| 55,56 | Painting |
| 157,158 | Advanced Painting |
| 159,160 | Printmaking |

**Botany:**

| | |
|---|---|
| 1, 2 | General Botany |
| 52 | Plant Identification |
| 55 | Structure of Vascular Plants |
| 101 | Principles of Heredity |
| 103 | General Bacteriology |
| 104 | The Structure and Identification of Lower Plants |
| 151 | Introductory Plant Physiology |
| 156 | Plant Ecology |
| 202 | Genetics |
| 203 | Plant Cytology |
| 204 | Anatomy and Morphology of Vascular Plants |
| 221 | Introductory Mycology |
| 225-226 | Special Problems |
| 240 | Plant Evolution |
| 252 | Plant Metabolism |
| 254 | Plant Water Relations |
| 255 | Taxonomy |
| 256 | Community Analysis and Classification |
| 257 | Principles of Plant Distribution |
| 258 | Physiology of Growth and Development |
| 259 | The Environment |
| 260 | Lichens |

**Forest Botany:**

| | |
|---|---|
| 253 | Dendrology |

**Chemistry:**

| | |
|---|---|
| 1, 2 | General Inorganic Chemistry |
| 42 | Introduction to Chemical Analysis |
| 61 | Fundamentals of Analytical Chemistry |
| 65 | Inorganic Chemistry |
| 70 | Quantitative Analysis |
| 132 | Quantitative and Instrumental Analysis |
| 151,152 | Organic Chemistry |
| 161,162 | Physical Chemistry |
| 191,192 | Independent Study |
| 206 | Elements of Theoretical Chemistry |
| 215 | Advanced Inorganic Chemistry |
| 216 | Nuclear Chemistry |
| 234 | Chemical Instrumentation |
| 251 | Qualitative Organic Analysis |
| 252 | Advanced Organic Preparations |
| 253 | Intermediate Organic Chemistry |
| 271 | Introduction to Research |
| 275-276 | Research |

**Classical Studies:**

**Greek**

| | |
|---|---|
| 1-2 | Course for Beginners |
| 15 | Mythology |
| 63-64 | Intermediate Greek |
| 105-106 | Homer, Plato |
| 107-108 | Euripides, Sophocles, and Aristophanes |
| 117-118 | Greek Prose Composition |
| 121,122 | Greek Literature in English Translation |
| 131 | History of Greece |
| 141,142 | Greek Art |
| 151 | Greek Archaeology |
| 191,192 | Independent Study |

**Latin**

| | |
|---|---|
| 1-2 | Course for Beginners |
| 63 | Cicero's Orations |
| 64 | Virgil's Aeneid |
| 91 | Latin Prose |
| 92 | Latin Poetry |
| 97 | Sight Reading in Classical Latin |
| 98 | Sight Reading in Medieval Latin |
| 101 | Tacitus |
| 102 | Juvenal |
| 103 | Cicero |
| 104 | Lucretius |
| 105-106 | Latin Prose Composition |
| 111,112 | Roman Literature in English Translation |
| 131,132 | History of Rome |
| 191,192 | Independent Study |
| 211-212 | Roman Oratory |

**Comparative Literature:**

| | |
|---|---|
| 191,192 | Independent Study |
| 201,202 | Romanticism |
| 203,204 | Realism and Symbolism |
| 205 | Foundations of Twentieth-Century European Literature |

For a description of the following courses see the departmental listing.

Readings in European Literature (English 153, 154)

Modern European Drama (English 155)

Religious Values in Classical and European Literature (Religion 187)

**Drama:** (See English)

**Economics and Business Administration:**

**Economics**

51-52 Principles of Economics
103 Transportation
132 The Economic History of the United States
149 The Theory of the Firm
150 Economic Thought Since Adam Smith
152 Global Geography
153 Money and Banking
154 Aggregative Economics
155 Labor Problems
160 Political Economy of Europe
161 European Economic Problems
169 Economics of Consumption
189 Business and Government
201 Senior Seminar in Economics
204 Advanced Money and Banking
218 Business Cycles
219 Economic Problems of Under-Developed Areas
231 Economic History of Europe
233 State and Local Finance
237-238 Statistical Methods
243 Mathematical Economics
244 Introduction to Econometrics
257 Dynamics of the Labor Movement
262 Trade Unionism and Collective Bargaining
265 International Trade and Finance
268 Competition and Monopoly
286 Latin American Economics
287 Public Finance
293 Economic Systems
294 Economic Functions of the State

**Accounting**

57 Principles of Accounting I
58 Principles of Accounting II
147 Accounting for Control
171 Accounting Theory
172 Corporate Accounts
178 Accounting Systems
180 Governmental Accounting
273,274 Auditing, Theory and Practice
275-276 Advanced Industrial Accounting and Management
277 Income Tax Accounting
278 Advanced Problems in Income Taxation
279 Budgeting and Control
295,296 Advanced Accounding Seminar-Theory and Practice

**Business Administration**

109 The Economic Geography of Latin America
114 Economic Geography of Africa
115 Fundamentals of Geography
120 Economic Geography of the Pacific
138 Business Statistics
143 Corporation Finance
144 Investments
181,182 Business Law
184 Commercial Law for Accountants
185 Business Administrative Organization
188 Personnel Management
249 Product Markets
290 The Use of Quantitative Methods in Business
291 Business Policy

**Education:**

5 Developmental Reading
68 Mental Hygiene
100 Social Foundations of American Education
101-102 Elementary Education: Principles and Practice
113 History of American Education
114 History of Education in European Culture
118 Educational Psychology
123 Language Arts in the Elementary School
142 Children's Literature
151 Public School Music Education
152 Public School Music Literature
153 Vocal Education in the Public School
161 Integrated Art in the Public School
162 Plastic Art in the Public School
201 Teaching and Supervision of Arithmetic
203 Principles of School Administration
204 The School as an Institution
210 Introduction to Educational Research

215 Secondary Education: Principles
216 Secondary Education: Internship
217 The Psychological Principles of Education
225 The Teaching of History and the Social Studies
226 Teaching Reading in the Elementary School
228 Improvement of Instruction in the Social Studies
232 Supervision of Instruction
234 Secondary-School Organization and Administration
235 The Nature, Function, and Reorganization of the Curriculum
236 Teaching Reading in the Secondary School
237 Literature for Adolescents
239 Methods of Problems of Teaching English in Secondary Schools
240 Educational and Occupational Information
241 Principles of Guidance
243 Personality Dynamics
246 The Teaching of Mathematics
253 School Law
258 Educational Measurements
266 Science in the Elementary School
276 The Teaching of High-School Science
290 Administration of School Property

**Engineering:** (See p. 54)

**English:**

1-2 Freshman Composition
53 Advanced Grammar and Writing
65-66 Imaginative Writing
93 Technical Communication
100 English for Foreign Students
101 Advanced Expository Writing
103-104 Narrative Writing

**Speech and Drama**

51 Essentials of Public Speaking
118 Persuasive Speaking
119 History of the Theater
121 Stagecraft
122 Play Production
139 The Speaking Voice
150 Oral Interpretation of Literature
151 Essentials of Public Speaking
152 Argumentation
171,172 Radio Broadcasting

**English and American Literature and Language**

55, 56 Representative British Writers
57, 58 Representative American Writers
111,112 Eighteenth-Century Literature
117 Milton
123,124 Shakespeare
125,126 English Literature, 1789-1832
127 The English Novel from the Beginnings to 1800
128 The English Novel in the Nineteenth Century
129 The English Novel in the Twentieth Century
131,132 English Literature, 1832-1900
133,134 Twentieth-Century Poetry
137,138 American Literature
141 Chaucer
142 English Literature of the Middle Ages
143,144 English Literature: Elizabethan and Seventeenth Century
147 The Literary Expression of Scientific Thought
148 Satire
153,154 Readings in European Literature
155 Modern European Drama
156 Modern English and American Drama
161 Development of the English Language
162 Modern English Grammar
165,166 American Fiction
181 Conference on Drama
182 Conference on Poetry
183 Conference on Fiction
184 Conference on Prose Nonfiction or a Special Topic
191,192 Independent Study
197-198 Senior Seminar in English
203 Chaucer
207,208 History of the English Language
209 Present-Day English
213 Introduction to Folklore

215,216 Elizabethan Drama
217 Milton
218 Spenser
219,220 The Eighteenth Century
221,222 English Literature of the Early Nineteenth Century
223,224 English Literature of the Later Nineteenth Century
227 Literary Criticism
229,230 American Literature, 1800-1865
233,234 American Literature, 1865-1920
235,236 American Literature Since 1920
237 English Drama, 1642-1800
239 Shakespeare
244 Literary Biography
251,252 English Literature in the Seventeenth Century
261,262 English Literature of the Twentieth Century
264 Major Developments of Contemporary American Poetry
266 Recent Critical Thought
269,270 Southern Literature
274 American Humor
277,278 English Literature of the Sixteenth Century

**Forestry:**

52 Principles of Forestry

**Geology:**

51, 52 General Geology
57 Geomorphology
103 Fundamentals of Mineralogy
106 Igneous and Metamorphic Rocks
108 Sedimentary Rocks
143 Principles of Stratigraphy
151 Economic Geology
152 Introductory Paleontology
164 Introduction to Geologic Field Methods
166 Structure
175,176 Majors Seminar
191,192 Independent Study

**German:**

1-2 Elementary German
63-64 Intermediate German
91,92 Introduction to German Literature
107,108 Scientific German
109-110 German Prose Fiction
115,116 German Drama of the Nineteenth Century
117,118 German Conversation
119,120 Survey of German Literature
125,126 Contemporary German Literature
131,132 Introduction to Goethe
133,134 The German Lyric
191,192 Independent Study
201,202 Goethe
203,204 Eighteenth Century
205,206 Middle High German
207,208 German Romanticism
209,210 Kleist, Grillparzer, and Hebbel
211,212 Heinrich Heine and His Time
213 Nineteenth-Century Literature
214 The Twentieth Century
215 Seventeenth-Century Literature
216 History of the German Language
218 The Teaching of German

**Government:** (See Political Science)

**Health and Physical Education**—Trinity College and The College of Engineering:

1-2 Freshman Physical Education
51 Apparatus-Tumbling
52 Badminton
53 Basketball-Handball
56 Advanced Swimming
57 Tennis-Volleyball
58 Golf
65 History and Principles of Physical Education
132 School Health Problems
163,164 Athletic Coaching in Secondary Schools
172 Recreational Leadership
182 The Administration of Athletics in Secondary Schools
190 Protective Practices in Physical Education

**Health and Physical Education**—Woman's College:

1-2 Activity Courses for Freshmen
51-52 Activity Courses for Sophomores
91 First Aid and Safety in Physical Education
101 History and Principles of Physical Education

102 The Teaching of Physical Education in Elementary Schools
103 Games and Rhythms for Children
105-106 Methods and Materials in Recreation
113 Mammalian Anatomy
114 Kinesiology
117 Physical Fitness and Individual Physical Education
119 Organization and Administration of Physical Education
120 Evaluation and Measurement in Physical Education
131 Health Problems in the Twentieth Century
134 School Health
140 Gereology and Health
170 Special Health Problems
181-182 Methods and Materials in Physical Education
185 Advanced Methods and Materials in Physical Education

**Hindi-Urdu:**

181,182 Intensive Elementary Hindustani
183,184 Intensive Intermediate Hindustani

**Hindi:**

185,186 Advanced Hindi Reading and Composition

**History:**

1,2 Modern History
51,52 Modern History
51X,52X Modern History
91 The Development of American Democracy to 1865
92 The Development of American Democracy, 1865 to the Present
95,96 Ancient and Medieval History
99 Naval History and Elementary Strategy
105-106 Political and Constitutional History of England
107-108 Social and Cultural History of England
109-110 History of Rome
111,112 America in the Colonial and Early Modern Era
113,114 America in the Twentieth Century
121,122 Foreign Relations of the United States, 1775 to the Present
123,124 City and Frontier in American History
127 History of Latin America Through the Formation of the National Governments
128 Inter-American Affairs
131,132 The Development of the Major South American Powers
135,136 Europe in the Twentieth Century
137,138 Foreign Relations of the European Powers
139,140 Nineteenth-Century Europe
141,142 China and Japan in Modern Times
147 The History of India to 1757
148 The History of India, 1757 to the Present
153,154 The History of the South
157,158 The Rise of Modern Science
161,162 Russia from Ivan the Terrible to Present Times
163,164 Reform and Politics in Nineteenth Century America
191,192 Independent Study, juniors
193,194 Independent Study, seniors
203-204 The United States, 1850-1900
205-206 The United States in the Twentieth Century
208 Economic History of India
212 Recent Interpretations of United States History
213-214 The Old South
215-216 The Diplomatic History of the United States
221-222 The Age of the Renaissance
223-224 The Old Regime and the French Revolution, 1661-1815
225-226 The Age of the Reformation
227-228 Europe in the Nineteenth Century
229 Recent Interpretations of Modern European History
231-232 The Hispanic Colonies and Republics in America
233-234 The Institutional, Cultural, and Social History of Hispanic America

235,236 European Expansion Overseas (1415-1898)
237-238 Europe in the Middle Ages, 395-1500
241-242 Nationalism and Communism in the Far East
245-246 War in the Modern World
247 The History of Modern India, 1757-1857
248 The History of Modern India and Pakistan, 1857-1947
249-250 Social and Intellectual History of the United States
251-252 Recent European History
259-260 The Emergence of the New South, 1865 to the Present
261-262 Russia in the Twentieth Century
263-264 American Colonial History and the Revolution, 1607-1789
267-268 England from Edward III to Anne
269 British History from 1714 to 1867
270 Great Britain and the Commonwealth of Nations, 1867 to the Present
285 Origins of Indian Civilization
297 The British Empire in the Nineteenth Century (from 1783)
298 The Commonwealth in the Twentieth Century

**Undergraduate Seminars**

195A-196A The Background of Modern European Civilization
195B-196B Twentieth-Century Europe
195C-196C Problems in American Intellectual History
195D-196D The Progressive Era Through the New Deal
195E-196E American History before 1789
195F-196F Problems in Nineteenth Century American Reform and Politics
195G-196G Nationalism and Communism in the Far East
195H-196H From Rural to Urban Society in the United States
195-I-196-I Nationalism and Freedom in Nineteenth Century Europe
197-198 Senior Honors Seminar

**Honors-Masters Program**

For a brief description of this program see page 37 of the **Bulletin of Undergraduate Instruction**

Colloquium 101,102. The University and the Scholar

**Linguistics:**

101 Introduction to Linguistics

For a description of the following courses consult the listings under the specifed departments.

History of the English Language (English 207, 208)
Present-Day English (English 209)
Old French Language and Literature (French 219)
Middle High German (German 205, 206)
History of the German Language (German 216)
Philosophy of Language (Philosophy 109)
Romance Linguistics (Romance Languages 224)
Cultural Anthropology (Sociology 94)
Old Spanish Language (Spanish 257)

**Mathematics:**

11 Algebra and Trigonometry
17 Introduction to Finite Mathematics
18 Elementary Statistics
21,22 Introductory Calculus
41,42 Introductory Calculus
63,64 Intermediate Calculus
83,84 Intermediate Calculus
111 Applied Mathematical Analysis I
112 Applied Mathematical Analysis II
113,114 Modern Algebra
131 Elementary Differential Equations
135,136 Probability and Statistics
139,140 Advanced Calculus
141,142 Junior Mathematics Seminar
183,184 Senior Mathematics Seminar
204 Geometry for Teachers
217-218 Analysis
221 Digital Computer
222 Introduction to Numerical Analysis
227,228 Theory of Numbers
229,230 Algebraic Numbers

233 Statistical Methods
234 Sample Designs
235,236 Abstract Algebra
244 Design of Experiments
247,248 Arithmetic of Polynomials
253,254 Differential Geometry
271,272 Introductory Topology
283 Probability for Engineers
285,286 Applied Mathematical Methods, I, II
287,288 Foundations of Mathematics
291,292 Theory of Functions

**Medical Science:**

M201 Anatomy as Related to Locomotion

**Music:**

55-56 Basic Musicianship
65-66 Music Theory I
115-116 Music Theory II
117,118 Music Theory III
121 Conducting
122 Orchestration

**History and Literature**

1-2 Introduction to Music
51-52 Introduction to Music
125 Masterworks of Music Literature
133 Orchestral Literature
134 Choral Literature
135 Piano Literature
136 Solo Song Literature
137 Chamber Music
138 Contemporary Music
139 The Evolution of Style in Twentieth Century Music
141 Beethoven: An Analysis of Classical System
147-148 History of Music
149 Organ Literature
163 Music in the Eighteenth Century
164 Music in the Nineteenth Century
165 Opera Literature
195,196 Collegium Musicum

**Musical Education**

57-58 Vocal Diction
106 Piano Methods and Materials
151 Public School Music Education
152 Public School Music Literature

**Applied Music—Instrumental and Voice**

**Naval Science:**

NS 101 Naval Orientation
NS 102 Naval History
91 Introductory Psychology
NS 202 Naval Weapons
NS 301 Naval Operations
NS 301M Evaluation of the Art of War
302 Navigation
302M Modern Basic Strategy and Tactics
401 Naval Engineering
402 Principles and Problems of Leadership

**Philosophy:**

41,42 Knowledge, Fact, and Value
48 Logic
91,92 Knowledge, Fact, and Value
93,94 History of Philosophy: Ancient and Modern
97 Political and Social Philosophy
98 Social Ideals and Utopias
101 Philosophy of Religion
103 Symbolic Logic
104 Philosophy of Science
109 Philosophy of Language
110 Epistemology
111 Metaphysics
117 History of Ethics
202 Philosophy of Art
203 Contemporary Ethical Theories
205 The Philosophy of History
208 Political Values
211 Plato
217 Aristotle
219 Kant
225 British Empiricism
227 Continental Rationalism
228 Recent and Contemporary Philosophy
229 American Pragmatism
232 Special Problems in the Philosophy of Science
241 Logic
250 Philosophical Analysis
252 Metaphysics
291,292 Critical Philosophy

**Physics:**

1-2 Introductory Physics
41-42 General Physics

125 Intermediate Physics—Mechanics
126 Intermediate Physics—Electricity
161,162 Modern Physics
171 Electronics
176 Intermediate Physics—Thermodynamics and Kinetic Theory
201,202 Mechanics
213,214 Contemporary Physics
217,218 Advanced Physics Laboratory
219 Electricity and Magnetism
220 Advanced Electronics
221,222 Theoretical Physics
225,226 Elementary Investigations

**Political Science:**

**Introductory Courses**

11-12 American and European Political Systems
61-62 American and European Political Systems

**Political Theory and Comparative Government**

123 Introduction to Political Philosophy
127 Introduction to Law
136 Major European Governments
143 Comparative Government and Politics: The Middle East
151 Comparative Government and Politics: Latin America
180 Comparative Government and Politics: Southern Asia I
181 Comparative Government and Politics: Southern Asia II
182 Comparative Government and Politics: Japan
183 Comparative Government and Politics: Southeast Asia
223 Political Thought to the Seventeenth Century
224 Modern Political Theory
225,226 Comparative Government and Politics
229 Recent and Contemporary Political Theory
231 American Political Theory
235 The British Commonwealth
250 Comparative Government and Politics: Southern Asia I
251 Comparative Government and Politics: Southern Asia II
252 Comparative Government and Politics: Japan
260 The Government and Politics of the U.S.S.R.

**American Government and Public Administration**

109 State and Local Government Today
125 American Political Parties and Practical Politics
129 Groups in American Politics
137 Political Behavior in Elections
138 Political Behavior in Policy Making
141 Public Administration
142 Administrative Responsibility
146 Legislation
161 Government and Planning
164 Government Regulatory Policy and Administration
174 Political Implications of Economic Legislation
190 Public Personnel Administration
207 American Constitutional Law and Theory
208 American Constitutional Law and Current National Problems
209 Problems in State and Local Government in the United States
230 American Political Institutions
234 Civil-Military Relationships in American Government
241 Administrative Management
242 National Administration
246 Government Administration and Public Policy
275 The National Party System
276 Comparative State Parties and Politics
291 Problems of Municipal Government
292 Municipal Administration

**International Law and Relations**

121 Elements of International Relations
122 Modern International Politics
124 The New States of Africa in World Affairs
158 Control of American Foreign Policy

221 International Public Organization
227-228 International Law

**Independent Reading and Undergraduate Seminar**

191,192 Independent Study
197,198 Senior Seminar in Political Science

**Psychology:**

91 Introductory Psychology
100 Personality and Social Behavior
101 Introductory Social Psychology
104 Comparative Psychology
108 Introduction to Biological Psychology
110 Applied Psychology
111 Advanced General Psychology
112 Physiological Psychology
116 Psychology of Adjustment
117 Statistical Methods in Psychology
118 Experimental Methods in Psychology
121 Child Psychology
122 Adjustment of the Pre-School Child
126 Adolescent Psychology
130 Principles and Methods of Psychological Evaluation
132 The Psychology of Individual Differences
141 Personality and Behavior Disorder
142 Instrumental Behavior
144 The Psychology of Learning
145 Experimental Approaches to Personality
147 Experimental Social Psychology
148 Psychology of Perception and Thinking
203 Psychology of Perception
204 Comparative Psychology
207,208 Independent Study and Research
210 Cognition and Higher Mental Processes
213,214 Conditioning and Learning
215 Developmental Psychology
216 Biological Psychology
217 Research Methods in Social Psychology
218 Social Psychology
225 Personality and Experimental Dynamics
229,230 Introduction to Research
233 Personality and Cognitive Processes
236 Theoretical Psychology
237 Functional Neurophysiology
238 The Electroencephalogram and Psychological Function
242 Measurement of Aptitudes, Interest and Achievement
245-246 Personality Theory and Assessment
265 Fundamental Statistical Applications in Psychological Research
266 Advanced Statistical Applications in Psychological Research
292 History of Psychology

**Religion:**

1-2 The English Bible
51-52 The English Bible
55 The Religion of the Bible
65 Jesus: The Man and His Message
85 Introduction to Christian Ethics
93 Survey of the World's Living Religions
100 Principles of Investigation
111 The Prophets of the Old Testament
121 The Mission and Message of Jesus
123 The Life and Letters of Paul
124 The Early Church from Paul to Irenaeus
131 History of Christianity from The Early Church through the Reformation
133 History of Christianity Since the Reformation
135 Christian Biography
137 Protestantism in America
138 Contemporary Religions in the United States
140 Christian Beliefs
144 Problems of Religious Thought
149 Current Interpretations of Christianity
152 Christian Ethics
156 Christian Marriage and the Family

160 Christian Education
171 Religions of the Ancient Near East
172 Religious Quests of the Greco-Roman World
175 Non-Christian Religions of the Modern World
179 Mysticism: Sacred and Profane
187 Religious Values in Classical and European Literature
191,192 Independent Study, juniors
193,194 Independent Study, seniors
195-196 Honors Research

**Senior Seminars**

203 Biblical Studies
204 Church History
205 Theology and Ethics
206 Christianity and Culture
207 History of Religions
228 The Theology of the Gospel and the Epistles of John
248 The Theology of Karl Barth
260 Wesley Studies
270 The Religion of the Hindus
272 Origins of Indian Civilization

**Romance Languages:**

**French**

1-2 Elementary French
63-64 Intermediate French
91-92 Introduction to French Literature
97 Spoken French
104 The Sixteenth Century
106 The Worlds of Rousseau
107 The Worlds of Voltaire
108 French Romanticism
109 Toward Modernism in French Poetry
111 French Drama of the Nineteenth Century
112 French Drama of the Twentieth Century
113 The Classical Ideal
127,128 Advanced Composition and Conversation
134 Contemporary French Life and Thought
191,192 Independent Study, juniors
193,194 Independent Study, seniors
209 Advanced Composition and Syntax
210 French Phonetics
213,214 French Classicism
219 Old French Literature
221,222 The Nineteenth Century French Novel
227 French Poetry Since Théophile Gautier
238 Anatole France
241,242 French Literature and Thought in the Age of Enlightenment
245 French Literature of the Twentieth Century, 1895-1925
246 French Literature of the Twentieth Century 1925-1955

**Italian**

181-182 Italian

**Portuguese**

181-182 Portuguese

**Spanish**

1-2 Elementary Spanish
63-64 Intermediate Spanish
91-92 Introduction to Spanish Literature
97 Spoken Spanish
156 Representative Writers of Spanish American Literature
161 Spanish Literature of the Renaissance and the Baroque
162 Spanish Romanticism
164 Spanish Civilization
165 Analysis of Great Spanish Authors
176 Advanced Conversation
191,192 Independent Study, juniors
193,194 Independent Study, seniors
251 The Origins of the Spanish Novel
252 Spanish Lyric Poetry Before 1700
253 The Origins of the Spanish Theater
255 Modern Latin American Literature
256 Contemporary Latin American Literature
258 Old Spanish Literature
259 Spanish Phonetics
260 Advanced Composition and Syntax
261 Nineteenth Century Novel

264 Modern and Contemporary Spanish Theatre
265 Golden Age Literature: Cervantes
266 Golden Age Literature: The Drama
275 Contemporary Spanish Literature: Essay and Lyric Poetry
276 Contemporary Spanish Literature: Novel

**Romance Languages:**

RL211 Approaches to Romance Literature
RL218 The Teaching of Romance Languages
RL224 Romance Linguistics

**Russian:**

1-2 Elementary Russian
63-64 Intermediate Russian
91-92 Advanced Russian
97,98 Spoken Russian
101,102 Russian Literature and Culture through the Nineteenth Century
103 Soviet Literature and Culture
105 The Russian Theatre and Drama
112 Pushkin and the Birth of Russian Realism
191,192 Independent Study
201,202 The Novelists of Nineteenth Century Russia

**Sociology and Anthropology:**

91,92 Introduction to Sociology
93 General Anthropology
94 Cultural Anthropology
131 Peoples of the World: American Indian
135 Peoples of the World: Africa, Asia, and Oceania
142 The Sociology of Mass Communication
145 Urban Sociology
146 Industry and Society
150 The Family
153 Sociology of the South
154 The Sociology of the Arts
155 Introduction to Industrial Sociology
159 The Negro in America
171 Public Opinion and Propaganda
172 Collective Behavior and Social Movements
191 Principles of Social Case Investigation
192 Introduction to Statistical Processes
199 Independent Study
232 Primitive Religion
234 Personality and Society
236 Personality and Culture
241 Social Stratification
242 The Sociology of Occupations and Professions
245 Deviant Social Behavior
247 Community and Society
253 Social Institutions
255 Race and Culture
275 Social Attitudes and Individual Behavior
278 Social Structure and the Life Cycle
281 Development of Sociological Theory
282 Principles of Sociological Analysis
295 Methodology in Sociology
296,297 Statistical Analysis in Sociology

**Zoology:**

1 Animal Biology
2 General Zoology
53 Comparative Vertebrate Anatomy
71 Heredity and Eugenics
92 General Embryology
103 Principles of Ecology
109 Evolution
110 Introduction to Genetics
120 Ornithology
151 Principles of Physiology
156 Vertebrate Histology
161 Animal Parasites
196 Seminar: Current Developments in Zoology
197,198 Special Problems
201 Animal Behavior
203 Ecology
210 Experimental Genetics
216 Limnology
222 Entomology
224 Vertebrate Zoology
228 Experimental Embryology
238 Systematic Zoology
243 Cytology
245 Radiation Biology

246 Molecular Biology
247 Biological Nucleonics
252 Comparative Physiology
253 Advanced Vertebrate Morphology
271 Cellular Physiology
274 Invertebrate Zoology
276 Protozoology
278 Invertebrate Embryology

## COLLEGE OF ENGINEERING

**Civil Engineering:**

61 Plane Surveying
72 Materials Laboratory I
101 Materials Laboratory II
S110 Plane Surveying
113 Route Surveying
116 Transportation Engineering
118 Materials of Engineering
121 Hydrology
123 Hydraulic Engineering
124 Fundamentals of Sanitary Engineering
126 Sanitary Engineering Design
131 Structural Mechanics I
132 Structural Design
133 Reinforced Concrete
135 Soil Mechanics
137,138 Seminar
140 Structural Mechanics II
143,144 Project in Civil Engineering
146 Professional Engineering
148 Structural Engineering
154 Geometric Thoroughfare Design
201 Theoretical and Applied Mechanics
202 Advanced Mechanics of Materials and Experimental Stress Analysis
203 Advanced Mechanics of Materials
204 Theory of Plates and Shells
205 Theory of Elasticity
211 Behavior of Materials
231 Structural Theory and Analysis
232 Reinforced Concrete Theory
235 Foundation Engineering
242 Hydraulic Engineering
244 Sanitary Engineering Processes
250 Engineering Analysis

**Electrical Engineering**

53 Electrical Engineering Fundamentals
55 Electric Networks I
56 Electric Networks II
109-110 Electromagnetic Systems
111-112 Electrical Principles Laboratory
123 Fundamentals of Electrical Engineering
124 Industrial Electrical Engineering
125 Electrical Fundamentals Laboratory
126 Industrial Electrical Laboratory
127 Electronics for Engineers
159 Transmission
161 High Voltage Phenomena
165-166 Electrical Engineering Seminar
171 Fundamentals of Illumination
173-174 Projects in Electrical Engineering
177 Energy Transmission and Radiation
179 Advanced Electrical Measurements
181-182 Electronic Networks
183-184 Electronics Laboratory
189 Electromagnetic Devices
191-192 Electric Machinery
193-194 Electric Machinery Laboratory
199 Linear Feedback Systems
201 Energy Systems
203,204 Information Systems
205 Analog Computation
207 Network Synthesis
211,212 Solid State Theory
213 Magnetics
221,222 Nonlinear Electromagnetics
231 Nuclear Engineering
241 Feedback Control Systems
242 Optimum Control Systems
243 Nonlinear Control Systems
259 Advanced Electric Energy Conversion
265 Advanced Topics in Electrical Engineering

**Mechanical Engineering:**

52 Kinematics, Kinetics
59 Materials and Processes
101-102 Engineering Thermodynamics
103 Thermodynamics
105 Dynamics of Liquids
106 Heat Transfer

113-114 Junior Mechanical Engineering Laboratory
116 Mechanical Engineering Laboratory
128 Dynamics of Gases
141,142 Machine Design
153 Heating, Air Conditioning and Refrigeration
156 Combustion Engines
157 Pumps, Compressors and Turbines
159-160 Senior Mechanical Engineering Laboratory
162 Power Plants
163 Vibration Control
164 Engineering Analysis
166 Air Conditioning Design
167 Industrial Engineering
168 Industrial Engineering Production Methods
171 Response of Physical Systems
173-174 Mechanical Engineering Seminar
182 Fundamentals of Nuclear Engineering
197-198 Projects in Mechanical Engineering
201 Theoretical and Applied Mechanics
202 Theoretical Thermodynamics
221 Analysis of Incompressible and compressible Fluid Flow
222 Analysis of Heat Transfer
231-232 Systems Engineering
280 Nuclear Reactor Power Cycles

**Engineering Subjects Common to All Curricula**

1 Engineering Graphics
2 Descriptive Geometry
57 Statics
60 Engineering Mechanics
107 Mechanics of Materials
109 Mechanics of Materials Laboratory
115 Dynamics
128 Fluid Mechanics
153 Architectural Engineering
169 Legal Aspects of Engineering
170 Patent Law for Engineers

# Calendar of the Colleges

## 1965

September 16 . . Thursday. 7:30 p.m. Orientation begins: Assemblies for all new students entering Trinity College, the Woman's College, and the College of Engineering.

September 20 . . Monday. Registration and matriculation of all students of Trinity College, the Woman's College, and the College of Engineering, who have not pre-registered.

September 22 . . Wednesday. Final registration of pre-registered students.

September 23 . . Thursday. Fall semester classes begin.

November 6 . . Saturday. Last day for reporting six-week grades.

November 24 . . Wednesday. 12:30 p.m. Thanksgiving recess begins.

November 29 . . Monday. 8:00 a.m. Classes are resumed.

December 11 . . Saturday. Founders' Day.

December 18 . . Saturday. 12:30 p.m. Christmas recess.

## 1966

January 3 . . . . Monday. 8:00 a.m. Classes are resumed.

January 15 . . . . Saturday. 12:30 p.m. Fall semester classes end.

January 18 . . . . Tuesday. Final examinations begin.

January 28 . . . . Friday. Final examinations end.

February 1 . . . . Tuesday. Registration and matriculation of new undergraduate students.

February 2 . . . . Wednesday. Last day for matriculation for the Spring semester.

February 3 . . . . Thursday. 8:00 a.m. Spring semester classes begin.

March 16 . . . . . Wednesday. Last day for reporting six-week grades.

March 26 . . . . . Saturday. 12:30 p.m. Spring recess begins.

April 4 . . . . . Monday. 8:00 a.m. Classes are resumed.

May 19 . . . . . Thursday. 5:00 p.m. Spring semester classes end.

May 21 . . . . . Saturday. Final examinations begin.

June 1 . . . . . Wednesday. Final examinations end.

June 4 . . . . . Saturday. Commencement begins.

June 5 . . . . . Sunday. Commencement Sermon.

June 6 . . . . . Monday. Graduating Exercises.




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